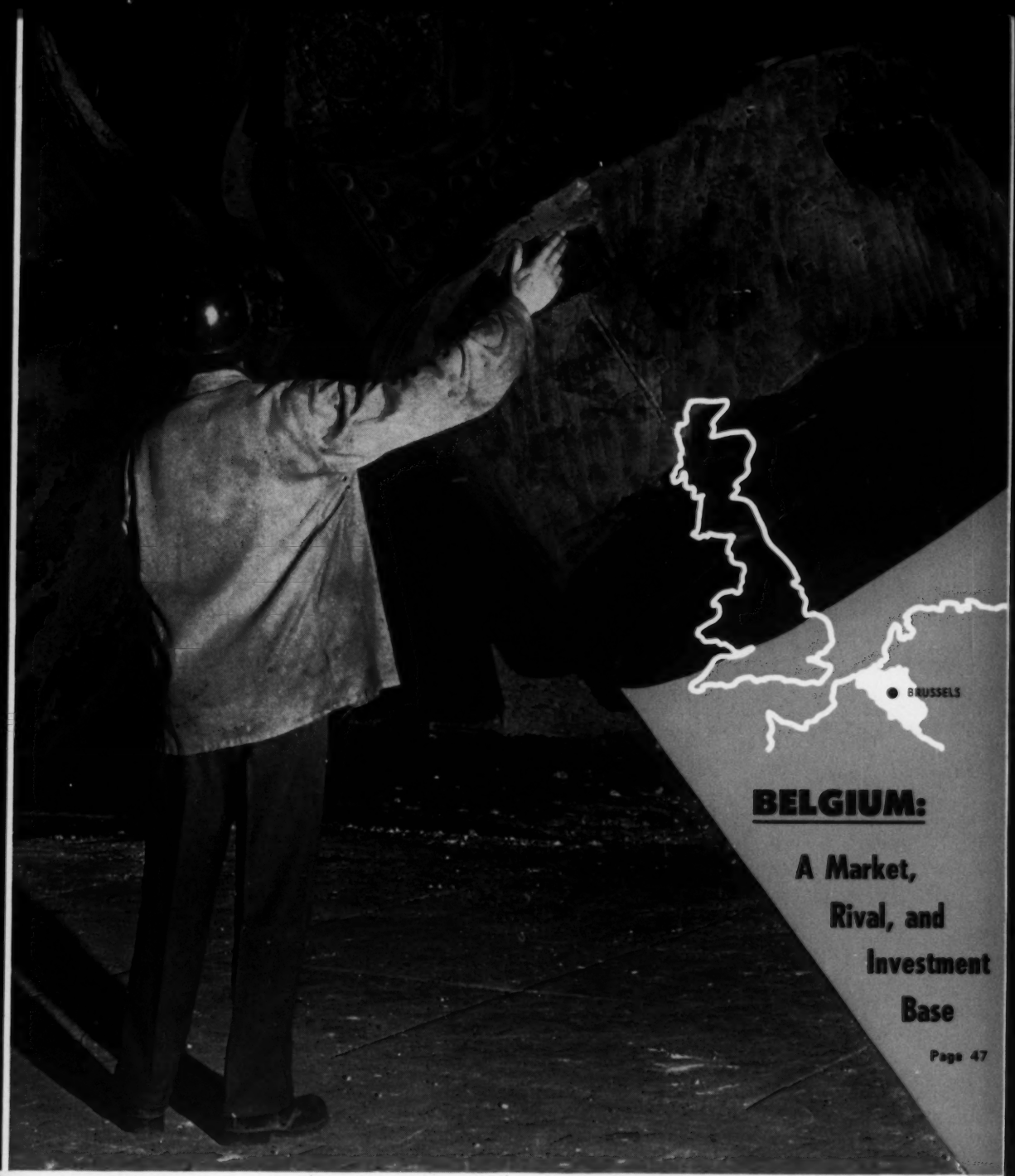
STEEL
The Metalworking Weekly
A PENTON PUBLICATION
JULY 10, 1961



BELGIUM:

A Market, Rival, and Investment Base

Page 47

Steel Price Boosts Are Coming 35

Tips for Better Surface Preparation . . . 70

'Water Bullets' Can Pierce Metal . . . 76

Aluminum Price Hikes Shaping Up 116

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We welcome inquiries

We are specialists in the custom-building of the types of gears shown here. We make them in quantity to your specifications.

Manufacturers who want that kind of wide specialization—and who are looking for a company that can serve as a "gear department" are indeed invited to write or phone. The answer will be prompt.

*REG. U. S. PAT. OFF.

EATON

AUTOMOTIVE GEAR DIVISION
MANUFACTURING COMPANY
RICHMOND, INDIANA

GEARS FOR AUTOMOTIVE, FARM EQUIPMENT AND GENERAL INDUSTRIAL APPLICATIONS
GEAR-MAKERS TO LEADING MANUFACTURERS

KNOW YOUR ALLOY STEELS . . .

This is one of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many who may find it useful to review fundamentals from time to time.

Steel *for Strength . . . Economy . . . Versatility*

Flame-Hardening Alloy Steels

The process known as flame-hardening involves the direct application of flame to the surface of steel, heating it above the transformation range, then hardening it by quenching. The primary purpose of this process is to achieve surface-hardness without affecting core properties. Jets of flame are played directly on the steel, and hardness penetration can be made to vary considerably. In alloy steels this depth will range usually from 0.03 to 0.12 in., the actual figure depending upon the method of heating and quenching used.

Unlike carburizing, flame-hardening does not involve the absorption of extraneous elements by the steel. There is no alteration of the chemical composition. To put it simply, the steel must have its own self-hardening characteristics; it cannot be dependent upon carbonaceous salt baths, gases, and other media.

Flame-hardening is not a substitute for the conventional furnace method. Each has its uses. The particular virtue of flame-hardening is that the flames can be directed to localized areas. The furnace, on the other hand, is generally more economical and feasible when parts produced in large quantities must be hardened all over.

Any type of hardenable steel, alloy or carbon, can be flame-hardened, and there will usually be no scale or pitting. The alloy content is the governing factor when determining the quench. In some cases a rapid quench is required; in others, it can be as slow as air-cooling. Tempering presents no problems, for flame-hardened steel can be tempered as if hardened to the same degree by other methods.

A list of typical flame-hardened parts includes such familiar items as gear and sprocket teeth, and certain types of cams and rollers, and shoe treads. A complete list would include many other parts that often require a localized hardening treatment, especially for wear-resistance.

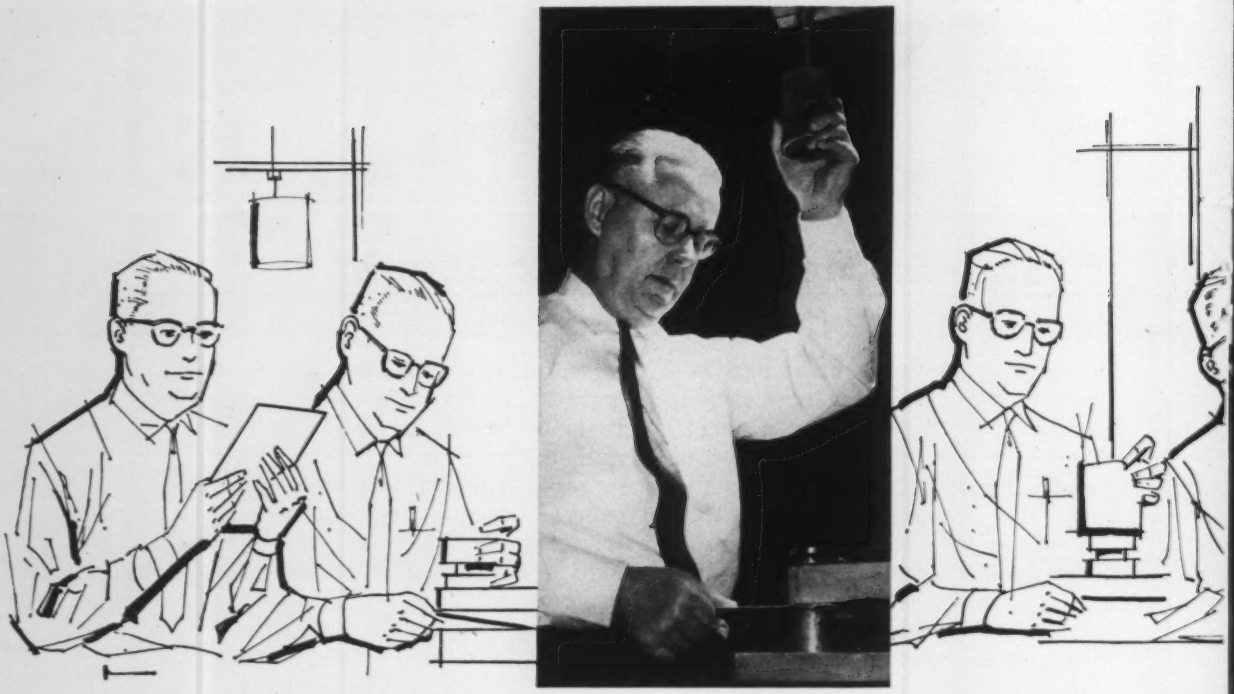
When you need information about flame-hardening methods, please feel free to consult with our technical staff. Bethlehem metallurgists will work with you, at no obligation, and you can depend on their suggestions. You can rely on Bethlehem, too, as a source of alloy steels . . . for Bethlehem makes the complete range of AISI standard grades, as well as special-analysis steels, and all carbon grades.

This series of alloy steel advertisements is now available as a compact booklet, "Quick Facts about Alloy Steels." If you would like a free copy, please address your request to Publications Department, Bethlehem Steel Company, Bethlehem, Pa.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA. *Export Sales:* Bethlehem Steel Export Corporation

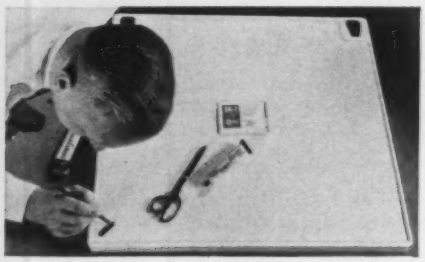
BETHLEHEM STEEL

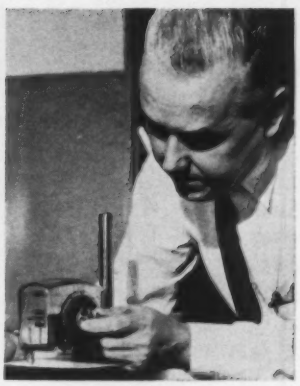
BETHLEHEM STEEL



UNIVIT and Armco Enameling Iron are

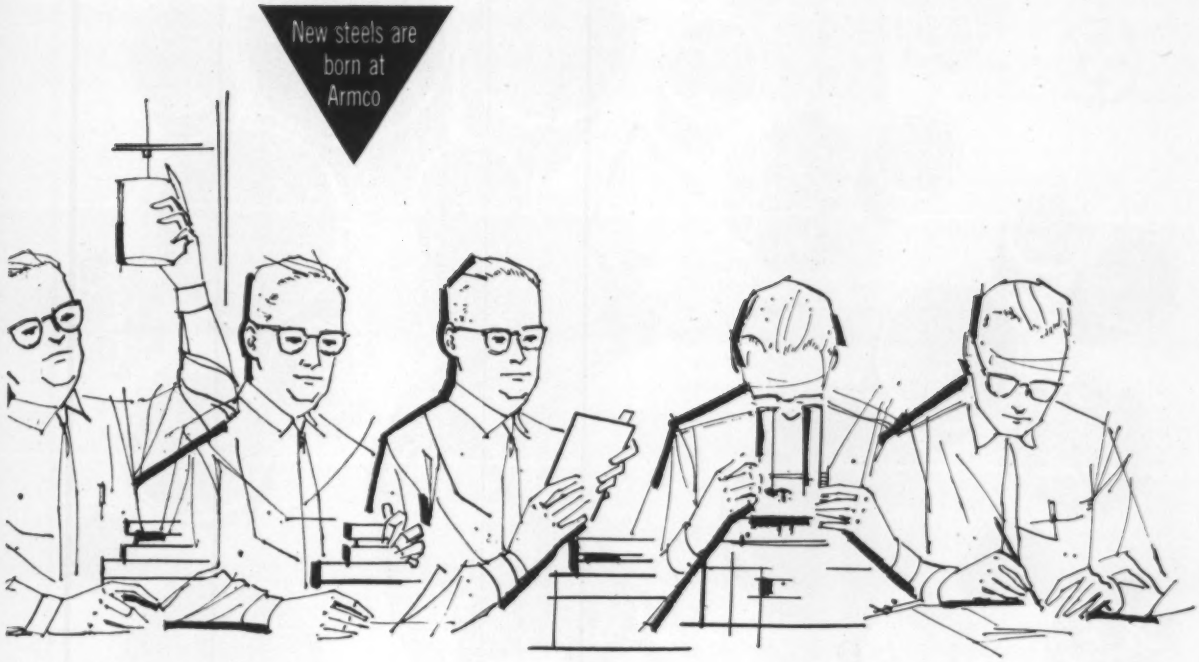
Specify Armco "Direct-On" or





Use this label. It identifies modern, durable steels in your products.

Porcelain Enameled Steel



backed by 51 years of research and experience

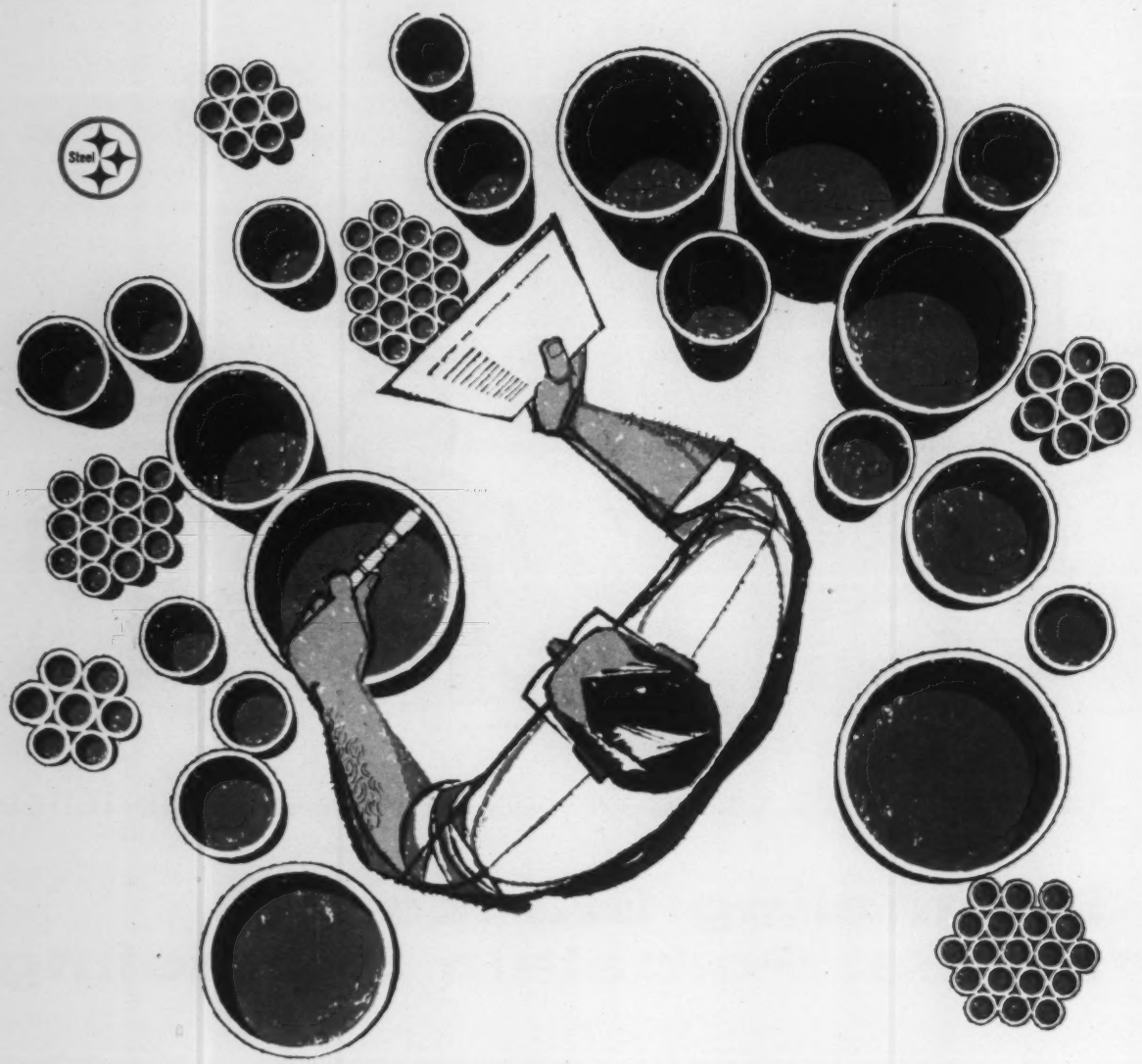
Enameling Grades for 2-Coat Porcelain Enameling

More than a half-century of technical and practical know-how stands behind Armco's two special base metals for porcelain enameling. Armco UNIVIT® is now available for one-coat, one-fire applications. Armco Enameling Iron is still known as "The World's Standard" for superior two-coat enameling.

Now UNIVIT permits "direct-on" porcelain enameling without danger of boiling or fishscaling. Resulting finishes fight abrasion and corrosion, provide exceptional resistance to mechanical damage and thermal shock.

For more information about UNIVIT and Armco Enameling Iron, call your nearest Armco Sales Office or write **Armco Division, Armco Steel Corporation, 2031 Curtis Street, Middletown, Ohio.**

ARMCO **Armco Division**



"Fitness report" with hundreds of identical copies

Armco Steel Corp. ♂
The Babcock & Wilcox Co., Tubular Products Div. ♂♀
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Southeastern Metals Co. ♂
The Standard Tube Co. ♂♀
Superior Tube Co. ♀
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Union Steel Corp. ♀
Van Huffel Tube Corp. ♂
Wall Tube & Metal Products Co. ♀

♀ PRODUCES WELDED STAINLESS STEEL TUBE
♂ PRODUCES WELDED CARBON STEEL TUBE

261

Here's the reason why you can count on welded carbon or stainless steel tubing in critical heat transfer applications: its method of manufacture, developed to high domestic standards, results in consistently reliable performance. Starting with clean, scale-free flat rolled steel the resulting tube surfaces are smooth, and free from scratches and pits. You are assured of concentricity, exact O.D. and I.D., precise wall thickness, and uniform ductility for bending or rolling in operations.

Whether you require carbon or stainless steel analyses, listed here are the quality welded tube producers ready to serve you. It will pay you to contact any of them or write for free Booklet 8591, Department ST-4, Welded Steel Tube Institute, Inc., Hanna Building, Cleveland 15, Ohio.

WELDED STEEL TUBE INSTITUTE, INC.

Men vs. Machines

Each Thursday, a group of bank and industrial business analysts meets in Cleveland to exchange views on the nation's economic health. Associate Editor Bob Jaynes (picture), who writes the "Business Trend" column East of here, is a member. He reports that last week the group was challenged by one of its banking members to pinpoint aftertax corporate profits (annual rate) for the second and fourth quarters this year.

The median estimate turned out like this: $21.5 billion for the second quarter, rising to $24.4 billion in the fourth. Then the banker revealed that electronic computers at his own institution had come up with almost identical figures.

We always like to cite things like the above. It reassures us that man is still the master. Sometimes we have doubts.

Easy Answers

Copy Editor Harry Chandler keeps warning us about the headlines that ask a question, but writers persist in a strange fondness for them.

In our June 12 issue (Page 101), Detroit Editor Don Postma was discussing aluminum engine design and asked this question in headline form: Can Cast Iron Cylinders Be Dropped? The answer came loud and clear: "Of course not; they'll break." It was supplied by Honorary Editor No. 2, Larry Megow of Hahn & Clay Machine & Boiler Works, Houston.

Out of the Rut

A few weeks ago, Associate Managing Editor John Morgan was interviewing some learned professors at the Harvard Business School about creativity in management. Their thesis was that managers tended to get into ruts. Their advice was to get out of them, using unusual methods if necessary (July 3, p. 33).

John was due for another appointment in downtown Boston, so one of the professors kindly offered to give him a lift over to the Cambridge stop on the Boston subway.

The professor's vehicle proved to be an Italian motor scooter. John was whizzed through Cambridge traffic, clutching a briefcase in one hand and the seat with the other.

Not only did our man make his next appointment, but he got out of a transportation rut. He's now eagerly awaiting waves of creativity to come over him.

Incidental Intelligence

A "shunpiker," says the magazine *Petroleum Today*, is a motorist who likes to veer from the beaten path and enjoy the byways rather than the highways. The term originated among thrifty colonial Yankees who sought ways to avoid the spreading network of toll roads operated for private gain.

Item: Two out of five motorists are women, but the weaker sex makes 50 per cent of all service station purchases. How do you explain that?

Item: Tenpin bowling, the ninepin version of which the Dutch introduced in the 17th Century, was launched in Holland on June 27, says American Machine & Foundry Co. Scene: New 18 lane center at Scheveningen.

Steel Prices

Associate Managing Editor Vance Bell, Market Editor Bill Rooney, and Pittsburgh Editor Bill Wallace have worked for weeks gathering information and opinions on the possibilities of a price hike in steel.

What they found and their conclusions appear on Page 35.

More Collectors' Items

On June 19, we mentioned our hobby of gathering sardonic motto cards. Here are some that Marvin Andersen of Albertson & Co. Inc., Sioux City, Iowa, likes:

Don't tell me what I mean . . . let me figure it out myself.

Your arguments are sound—all sound.

If everything else fails, read the directions.

Please—let's keep this confusion orderly.

STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $30 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

TO FIND THE MAN YOU NEED . . .

Place an advertisement in the "Help Wanted" columns of STEEL's classified pages. Your advertisement will reach the qualified men you need, because STEEL is addressed to highly-trained men in all phases of metalworking.

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The Metalworking Weekly

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The Metalworking Weekly

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Fluid Power NEWS

OILGEAR 40 Years of Fluid Power

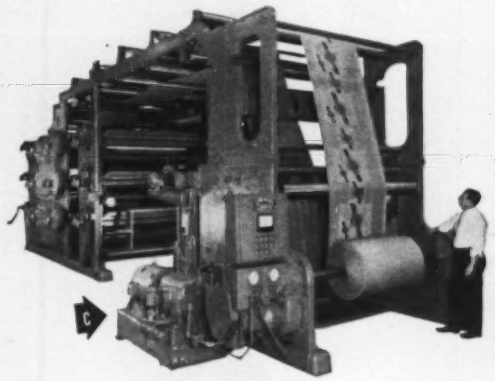
Report No. 12,301 — From Oilgear *Application-Engineering* Files

HOW OILGEAR *Any-Speed* DRIVE SYSTEMS ON *SCHMUTZ* 6-COLOR PRINTING PRESSES HELP BOOST PERFORMANCE, EFFICIENCY, ECONOMY, CONVENIENCE — IN LESS SPACE

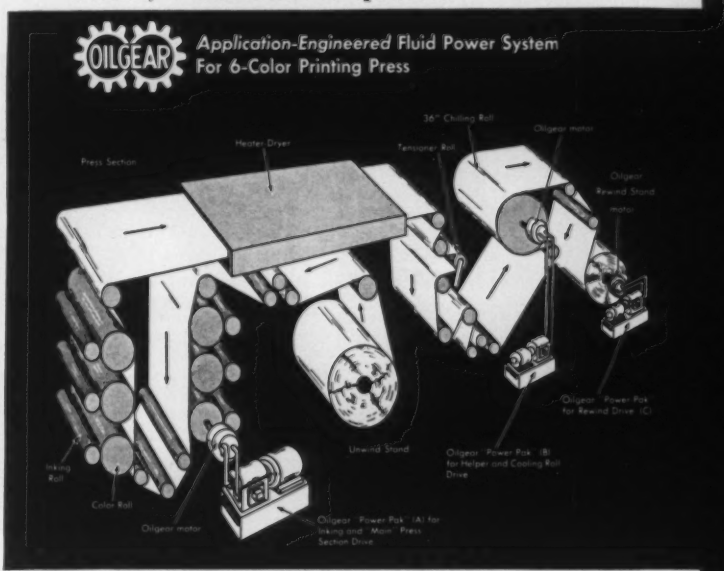
CUSTOMER: *Schmutz Manufacturing Company, Louisville, Kentucky.*

PROBLEM: Main and rewind drives with control systems for web-fed, 6-color printing presses for printing packaging stock — from 50 or 60-lb kraft, to container and food board. Web widths vary from 40"to 84", with impression "repeat" varying from 14" to 84".

REQUIREMENTS: 1. Constant or absolute tension on the press section to provide "dot-to-dot" register over an infinitely variable (stepless) speed range from 0 to 1000 feet per minute . . . and hold set speed and tension without variation regardless of fluctuations in load, electrical power input, or temperature. 2. Provide either constant or tapering tension for rewind — from 4" cores to 40" or 60" dia. rolls. 3. Must be economical from the standpoints of installed cost — operation and maintenance — floor space — and electrical power input. 4. Clean, quiet operation — with minimum heat dissipation. 5. To be "packaged" or pre-assembled for simplicity and speed of installation. 6. Eliminate, if possible, the long lineshaft drive that "closed up" one side of the press. 7. Be capable of dependable, trouble-free, continuous, 'round-the-clock operation.



ABOVE: Rewind end of an Oilgear-equipped, 84" Schmutz High Speed Press — with 84" maximum impression repeat, speed range from 0 to 1000 fpm — with constant acceleration and deceleration rates. Oilgear Rewind Drive, indicated, can hold in stalled condition indefinitely — follow press speeds and rewind from a 4" core to 60" roll. The variable, constant or drooping tension characteristics with absolute constant or decreasing tension — without any steps whatsoever — enable this Oilgear-powered 6-color press to hold register closer than previously experienced.



SOLUTION: Three separate Oilgear Servo-Valve-Controlled Pump and Motor Drives to provide stepless, infinitely variable speed control. Fully interlocked feedback systems hold speeds and tensions to a new high degree of accuracy unobtainable with the adjustable speed electrical drives formerly used. An Oilgear "Plus" feature — "memory" — permits the press to be stopped for periods of several hours, and if not reset, will automatically resume operation at the identical former speed and tension. Space requirements are drastically reduced — *Oilgear Direct-Drive,* Fluid Power Motors are smaller than the gear reducers formerly required — and space consuming power rectifiers are eliminated. Operating economy has been improved — Oilgear Drives use less than ½ the former input power. Oilgear Drives do not require high-speed blowers for cooling — are whisper-quiet in operation . . . can hold stall-speed indefinitely without overheating. Another advantage—*lower installed cost.* These are some of the major advantages that help convince Schmutz to "join the swing" to Oilgear Drives and Control Systems . . . user satisfaction is, of course, the ultimate factor.

For example, one Schmutz customer reports — *"Our press is in operation 24 hours per day — 6 days per week. We can measure our Oilgear maintenance in nickels per year . . . with previous drives we had to carry $1000 worth of tubes in stock."*

This is merely one of innumerable "problem drives" solved by Oilgear Application-Engineering teamwork — and Oilgear ANY-SPEED Drives and Control Systems . . . for new standards of performance — greater accuracy, precision control of speeds, torques, tensions . . . for new economy of operation, installation, maintenance, and valuable floor space . . . for longer, more dependable life. These are sound, basic, *installation-proved* reasons why there are more and more Oilgear users in the paper, printing and converting, marine, food and beverage, chemical, pharmaceutical, primary metals, metal-working, textile, rubber, military, and other industries who all agree that . . .

"for the lowest-cost-per-year . . . it's OILGEAR!"

For practical solutions to YOUR rotary or linear drive and control problems, call the factory-trained Oilgear Application-Engineer in your vicinity. Or write, stating your specific requirements, directly to . . .

THE OILGEAR COMPANY

Application-Engineered Fluid Power Systems

1572 WEST PIERCE STREET • MILWAUKEE 4, WISCONSIN

Phone: Mitchell 5-6715 — Direct Distance Dialing Code — 414

Modern board forging hammer

DEPENDABILITY of shifter fork improved by designing it to be FORGED

By designing the shifter fork of his transmission to be forged, a manufacturer of earthmovers eliminated costly equipment breakdowns in the field because of fork failure. Factor of safety was *in*creased even while weight and over-all costs were being *de*creased.

Parts scrapped because of voids uncovered after much high-cost machining are eliminated . . . forgings are *naturally* sound all the way through. Forgings start as *better* metal . . . are further *improved* by the compacting hammer-blows or high-pressure of the forging process.

Design your parts to be forged . . . increase strength/weight ratio, reduce as-assembled cost, improve performance. Literature to help you design, specify, and procure forged parts is available on request.

When it's a vital part, design it to be FORGED

Drop Forging Association • Cleveland 13, Ohio

Names of sponsoring companies on request to this magazine

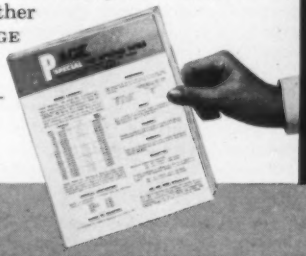
CUT WIRE COSTS UP TO 60%!

. . . with Page Special HB

If you are now using music wire, or if you have been prevented from using it because of its high cost, it makes good sense to investigate PAGE *Special* HB. In every case, the tensile strengths of *Special* HB approach those of music wire—and in sizes .090″ and coarser equals them! Moreover, *Special* HB costs as much as 60% less than music wire.

A hard-drawn, high-carbon steel wire, *Special* HB is available in galvanized or bright finishes and in diameters from .020″ to .162″. We'll be glad to send you the full story, including a detailed comparison of tensile strengths.

As America's leading special-purpose wire mill, PAGE can supply a wide variety of manufacturers wire items with just the tensile strength, ductility, finish and other properties you need. Tell us your requirements—we'll recommend a PAGE wire to help you reduce costs and improve your product.



Write us at Monessen, Pa. for Booklet **DH-107** on *Special* HB—or for information on what PAGE has to offer to meet your other wire requirements.

PAGE

the source for answers to wire problems

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PAGE STEEL AND WIRE DIVISION • AMERICAN CHAIN & CABLE COMPANY, INC.

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bearings and parts

Take the simple, sure, direct route to lower manufacturing and maintenance cost. Design into your product Bunting Standard Stock Bearings. You avoid inventory investment, delays, confusions, production problems by the immediate availability in small or large lots, from local distributors all over America, of hundreds of different stock sizes of completely finished cast bronze and sintered bronze bearings and bars, aluminum bars and Nylon shapes.

Special design bearings not obtainable from stock can be procured immediately at low cost from Bunting fully equipped machine shops in five industrial centers. The wide range of sizes of Bunting Stock Cast Bronze and Sintered Bronze Bearings makes the alteration of a stock item to a special bearing easy and economical. Bunting Cast Bronze, Sintered Bronze, Aluminum Bars and Nylon shapes provide the materials for special requirements which cannot be made from stock bearings. Your local Bunting Distributor can arrange for such work.

A large staff of bearing engineers in the field stands ready to assist in the use of these Bunting stock products and in the designing of bearings or components for extraordinary applications. Two big, modern plants assure ample production capacity at all times for bearings and parts made from all modern metals and materials.

See Bunting's complete catalog, Sweets Product Design File 11C/BU or ask for Bunting's General Catalog, Form 158; Nylon Catalog, Form 32; Technical Handbook on Bunting Nylon, Form 33; The Technology of Bunting Aluminum, Form 46; Engineering Handbook of Powder Metallurgy, Form 1; Bunting Machine Shop Service, Form 4.

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BEARINGS, BUSHINGS, BARS AND SPECIAL PARTS OF CAST BRONZE, SINTERED METALS, ALUMINUM ALLOYS AND NYLON

CALENDAR
OF MEETINGS

Aug. 15-17, Cryogenic Engineering Conference: University of Michigan, Ann Arbor, Mich. Conference secretary: K. D. Timmerhaus, Department of Chemical Engineering, University of Colorado, Boulder, Colo.

Aug. 16-19, Society of Automotive Engineers: National meeting, West Coast, Sheraton Hotel, Portland, Oreg. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: Joseph Gilbert.

Aug. 22-25, Western Electronic Show and Convention: Cow Palace, San Francisco. Convention director: Calvin K. Townsend. Business office: 1435 La Cienega Blvd., Los Angeles 35, Calif. Northern California office: 701 Welch Rd., Palo Alto, Calif.

Sept. 10-12, Steel Service Center Institute: Great Lakes regional meeting, Greenbrier Hotel, White Sulphur Springs, W. Va. Institute's address: 540 Terminal Tower, Cleveland 13, Ohio. Executive vice president: Robert G. Welch.

Sept. 11-12, American Supply & Machinery Manufacturers' Association Inc.: Industrial distribution conference, Statler Hilton Hotel, Cleveland. Association's address: 2130 Keith Bldg., Cleveland 15, Ohio. Business manager: W. B. Thomas.

Sept. 11-13, American Mining Congress: 1961 mining convention, Hotel Olympic, Seattle. Congress' address: 1102 Ring Bldg., Washington 6, D. C. Executive vice president: Julian D. Conover.

Sept. 11-15, Instrument Society of America: Annual Instrument-Automation Show, Memorial Sports Arena, Los Angeles. Society's address: 313 Sixth Ave., Pittsburgh 22, Pa. Executive director: William H. Kushnick.

Sept. 17-20, Society of Mining Engineers of AIME: Froth Flotation Symposium sponsored by Minerals Beneficiation Division, Denver. Society's address: 29 W. 39th St., New York 18, N. Y. Division chairman: Neil Plummer, Magna, Utah.

Sept. 17-21, Non-Ferrous Founders' Society: Annual meeting, Shawnee Inn, Shawnee-on-Delaware, Pa. Society's address: 1604 Chicago Ave., Evanston, Ill. Executive secretary: Herbert F. Scobie.

Sept. 18-20, Standards Engineers Society Inc.: Annual meeting, Hotel Sherman, Chicago. Society's address: Box 281, Camden 1, N. J.

Sept. 21-22, American Institute of Electrical Engineers: Industrial Electronics Symposium, Bradford Hotel, Boston. Institute's address: 33 W. 39th St., New York 18, N. Y. Secretary: N. S. Hibshman.

Steel

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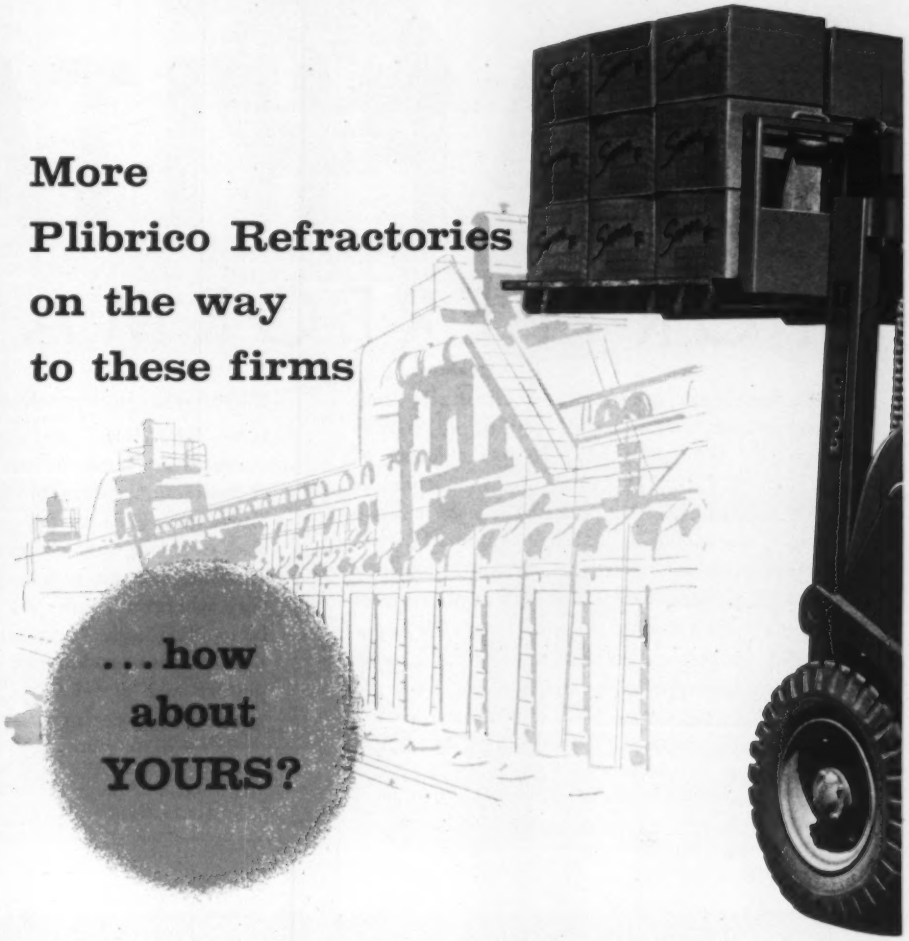

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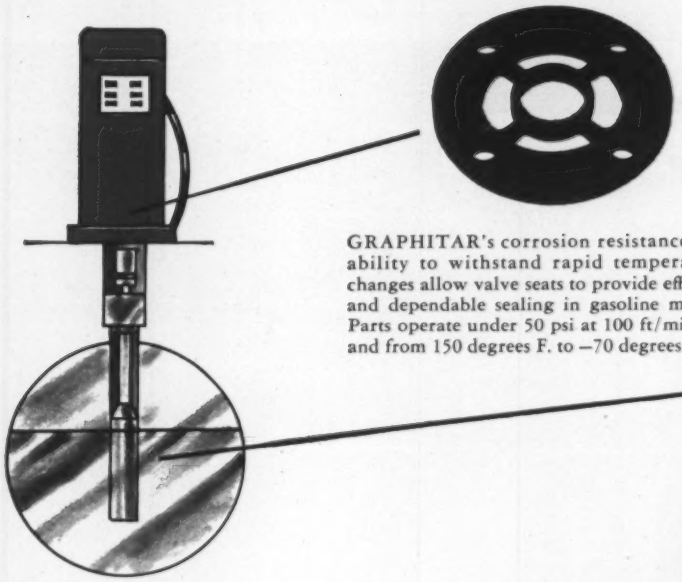
Superior performance and unusually long service life, even in tough applications, is practically second nature to parts made of GRAPHITAR. That's because they combine GRAPHITAR's chemical stability, heat resistance, low coefficient of friction, adaptability to self-lubrication, mechanical strength, hardness and light weight. An everyday application of GRAPHITAR that illustrates well its versatility and remarkable performance can be found in the face-type valves employed in bulk station gasoline meters.

These valves incorporate GRAPHITAR seats.

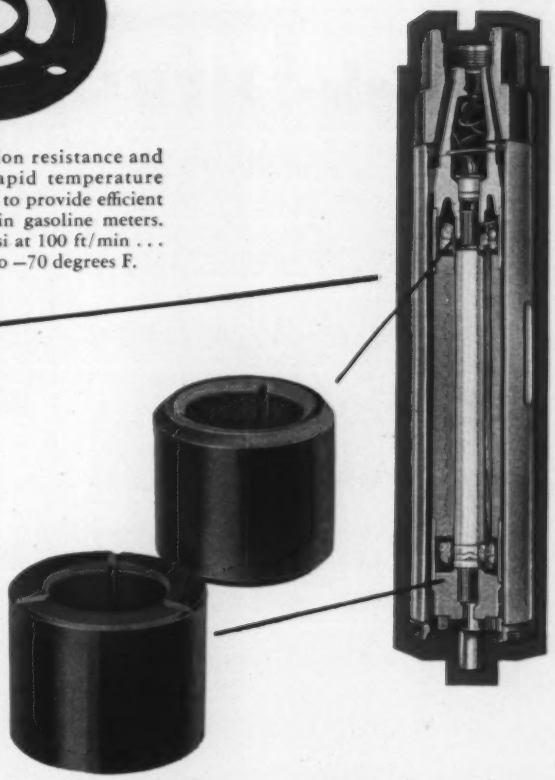
Here, GRAPHITAR's corrosion resistance, chemical inertness and resistance to expansion or contraction under rapid temperature changes, allow the valves to provide a leak-tight seal with excellent wear characteristics. These same characteristics are necessary for good performance wherever steam, gas and chemicals must be handled under the most adverse conditions. Perhaps your product can benefit from the top performance of GRAPHITAR, a unique and versatile engineering material.

Comparative testing of various grades of GRAPHITAR self-aligning seals is accomplished on this equipment, which duplicates actual operating conditions. GRAPHITAR rotary pressure joint seals such as these often operate at 400 psi, at 650°F. and at rotary speeds of 600 ft/min.

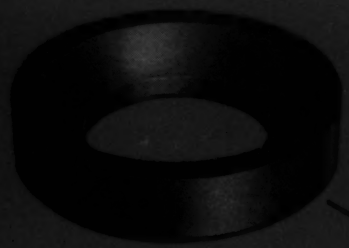
Tests show that the compressive strength of GRAPHITAR grades varies from 4,500 to 45,000 psi. Correct part design can take advantage of this desirable characteristic to aid part performance.



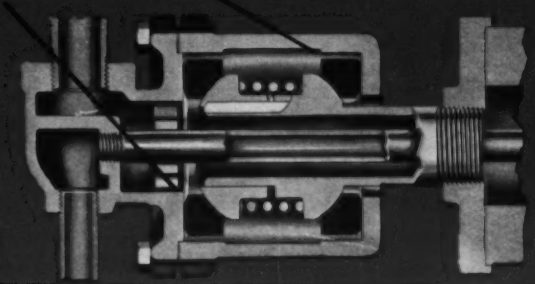
GRAPHITAR's corrosion resistance and ability to withstand rapid temperature changes allow valve seats to provide efficient and dependable sealing in gasoline meters. Parts operate under 50 psi at 100 ft/min . . . and from 150 degrees F. to —70 degrees F.



Running directly in the gasoline reservoirs below ground level, a submersible, explosion proof pump depends on two GRAPHITAR bearings to keep its operation safe and smooth. GRAPHITAR is non-metallic, will not weld or score even when in contact with a dry metal shaft. Because GRAPHITAR operates with *any* liquid as a lubricant, it is an ideal bearing material wherever low viscosity liquids such as gasoline are encountered.



Self-aligning seals of GRAPHITAR are employed in rotary pressure joints handling steam, water, hot oil, trichlorethylene, powdered talc and a variety of chemicals. GRAPHITAR has the ability to withstand the action of many such chemicals and only very highly oxidizing reagents in hot and concentrated form can react to destroy GRAPHITAR.



GRAPHITAR is a material uniquely designed by its nature for solving tough problems and improving processing, and it can be further custom-engineered to meet your exact specifications. For complete information on GRAPHITAR . . . send for Engineering Bulletin #20.

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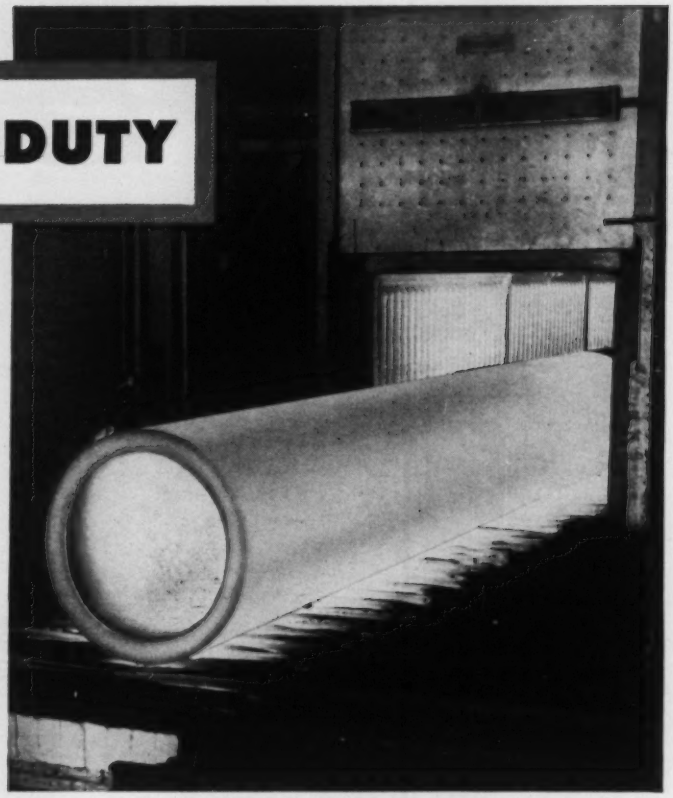
R-299-2

Ask HEVI-DUTY

Sandusky Foundry and Machine Company did...

and now heat treats centrifugal castings of carbon and alloy steel at controlled, uniform temperatures up to 2050° F. with a



Sandusky Foundry and Machine Co. selected this Hevi-Duty Electric Car Bottom Furnace, rated at 2050° F. for their heat treating requirements. Casting being heat treated here weighs 13,700 lbs.

HEVI-DUTY CAR BOTTOM FURNACE

When your heat treating applications demand *quality production at uniform controlled temperatures*, Hevi-Duty can supply either electric or fuel-fired furnaces to meet your requirements.

For example: At Sandusky Foundry and Machine Co., Sandusky, Ohio, centrifugal steel castings up to 50 inches in diameter by 33 feet in length have been heat treated in a Hevi-Duty Electric Car Bottom Furnace. This furnace provides accurately controlled temperatures to 2050° F. in its 6′ x 6′ x 34′ long chamber. They use it to normalize, temper and anneal steel and stainless steel castings. Parts are either air cooled or water quenched.

The Hevi-Duty Car Bottom Furnace features five zones of temperature control, and by placing a dividing wall between the three forward and two rear zones, two separate loads with different temperature ranges can be treated simultaneously. Heating elements in side and end walls, ceiling, door and car bottom, plus three removable air-circulating fans help provide uniformity of temperature.

Whatever your particular heat treating application, there's a Hevi-Duty furnace designed to do the job. Car Bottom Furnaces are available with many arrangements and optional features—single or double end, retort type, controlled atmosphere, forced-air convection and others. Be sure to contact Hevi-Duty first for your heat processing equipment needs.

HEVI-DUTY

A DIVISION OF BPC BASIC PRODUCTS CORPORATION

ASK HEVI-DUTY

for more information on electric or fuel-fired heat treating furnaces. Car Bottom Furnaces are fully described in Bulletin 644R.

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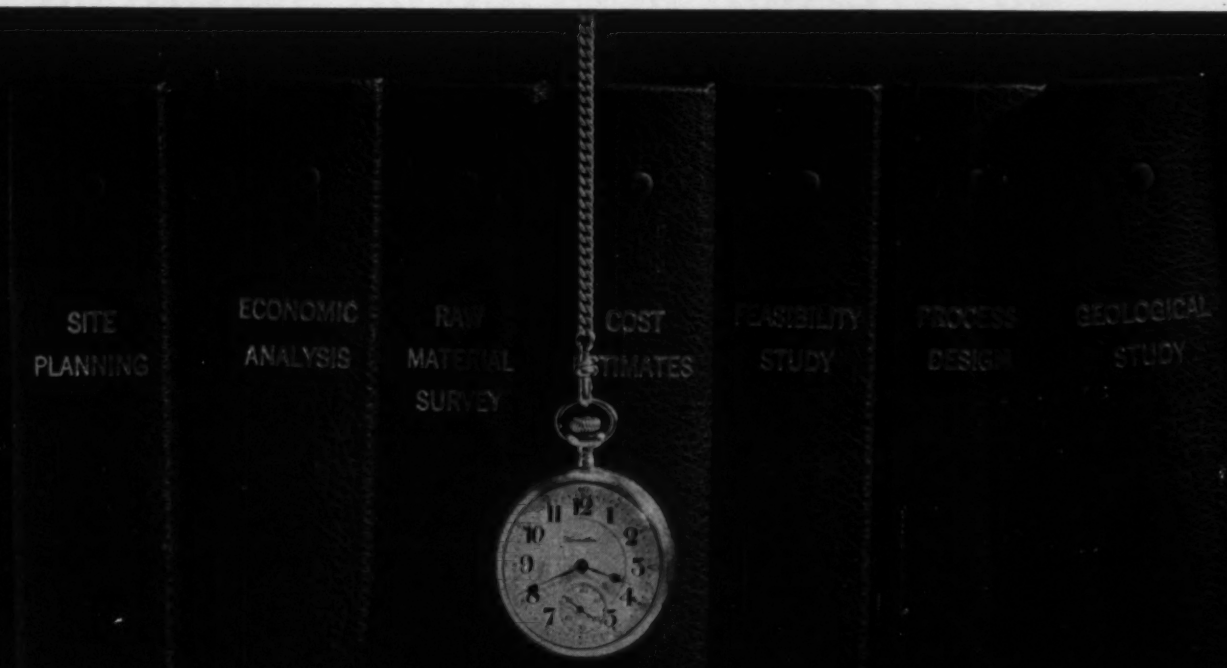
Pre-Engineering by **KAISER ENGINEERS** answers basic plant expansion questions...



Timely? Many complex factors shape the final decision to proceed with your expansion plans...and timing is an important one. Independent analysis of all aspects of your proposed program is the *Pre-Engineering* service offered by Kaiser Engineers. The studies and evaluations furnished by KE Pre-Engineering represent only one phase of total KE services. Kaiser Engineers designs and builds for the Steel industry...offers skilled experience in all types of facilities from raw material plants to finishing mills. From Pre-Engineering through design and construction, Kaiser Engineers provides complete, one-company service and ingenuity based on years of experience.

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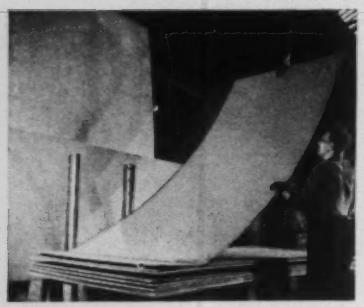
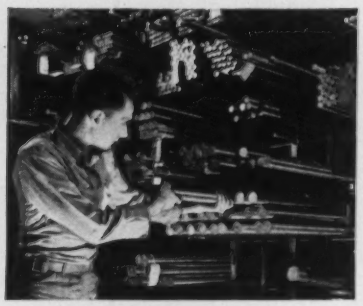
BUYERS' GUIDE...
to Ryerson service on stainless

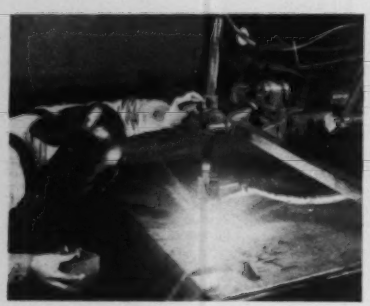


PLATES—Available in 9 analyses including plates to Atomic Energy Commission requirements and to ASTM specifications for code work. Also low carbon types for easy welding.

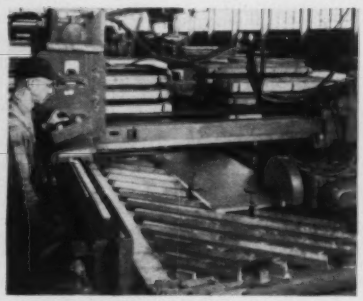
SHEETS—11 analyses of Allegheny stainless sheets in stock including nickel and straight chrome types. Also extra wide sheets to reduce welding costs, expanded and perforated sheets.



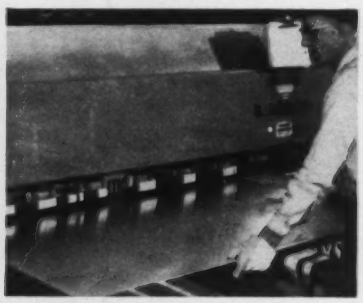
BARS AND ANGLES—Rounds, squares, flat's, hex's and angles in 8 types including free-machining bars with both analysis and mechanical properties controlled.



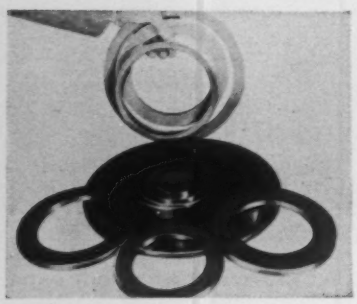
HELIARC CUTTING available on request. Cleaner, smoother cut edges. Better machining because of minimum contamination and distortion. Less carbide precipitation.



TRUE-SQUARE ABRASIVE CUTS.—Stainless plates to 12' x 25' cut true square on abrasive disc machine. Length and width tolerance plus or minus 1/32".



SHEARING—Accurate cutting of stainless sheets and light plate to the industry's tightest specifications. Shear hold-down clamps padded to protect sheet finish and flatness.



RINGS AND DISCS—Machine cut to your order. This service assures size accuracy, smooth edges, flatness and unaffected corrosion resistance—a lower-cost, ready-to-use product.

HEADS—A.S.M.E. flanged and dished heads in types 304, 304L, 316 and 316L are on hand in large quantities, and in a wide range of gauges and sizes.

PIPE AND TUBING—Light wall, standard and extra heavy pipe, ornamental and regular stainless tubing. Also screwed type and welding fittings and Cooper stainless valves.

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METALOGICS PLUS VALUES IN STEEL • ALUMINUM • PLASTICS • MACHINERY

STEEL
The Metalworking Weekly

Metalworking Week®

July 10, 1961

Metals Buyers: Watch for Price Hikes in Fall

Steel and aluminum producers are eying the fourth quarter, looking for propitious times to boost prices. Pressures from rising labor costs have been building up in both industries. Yet, the price on finished steel has gone down 0.6 per cent since the last general increase in steel prices was initiated during August, 1958. Aluminum producers have fared little better—the present ingot price of 26 cents a pound is no higher than the price late in 1957. The prospects: In steel, a probable increase averaging $4 to $5 a ton in base prices of selected forms around Oct. 1. (See Page 35.) In aluminum, a modest hike of about 1 cent a pound for ingots. (See Page 116.)

Consumer Spending for Durables Due for Increase

If yours is an average household, you have a $7000 investment in durable goods, but they would probably be worth only $3300 if you tried to resell them. So concludes Raymond Goldsmith of the National Bureau of Economic Research. He says the need for replacement and the growth of family formations will increase the rate of consumer spending for durables, like cars and refrigerators, to a rate of 2 to 3 per cent annually in the next few years. For the last five years, the rate has limped along at 1 per cent annually vs. 8 per cent annually from 1946 through 1955.

Borg-Warner Head Sees Gradual Upturn in Durables

Although there appears to be agreement that the recession in durable goods is over, "we believe the upturn will be gradual and minimal," comments Robert S. Ingersoll, president, Borg-Warner Corp., Chicago. In the *Business Outlook* of the First National Bank of Chicago, he observes: "We particularly look for modest second half gains in . . . electrical machinery, appliances, and air conditioning. Dollar volume for electrical machinery may run 5 per cent ahead of 1960's, but earnings will continue to suffer."

Skilled Help Wanted in Construction

By 1970, the construction industry will employ 4.2 million skilled craftsmen, if they can be found, says F. H. Beinhauer, chairman, Apprenticeship & Training Committee, Associated General Contractors of America. In the next ten years, at least 1.9 million men will have to be trained. Because 50 per cent of all apprentices drop out before training is completed, the industry might have to interest close to 4 million young men in the crafts, he says. The sad tale: Department of Labor Statistics reveals that between

115,000 and 120,000 were in building apprenticeships during 1960—exactly the number enrolled in courses during 1950.

Belgium: Market, Competitor, and Investment Base

Though Belgium must lick some thorny problems—political, economic, and sociological—it is becoming more and more important to U. S. metalworking. The attractions: A sound industrial and agricultural base, a hard working populace, good natural resources, and an essentially stable administration, make the tiny country (about the size of Maryland), a sure bet for growth. Belgium is modernizing its industry, mostly with its own money, and shooting for an expanded economy with laws drawn to enhance the growth climate. For a thoroughgoing analysis of what's ahead there, see Page 47.

June Construction Figures Tally $5.12 Billion

The construction industry set a brisk pace in June. In a preliminary estimate, the Bureau of the Census sets the value of total new construction put in place at $5.12 billion; 9 per cent more than in May, 1961, and 2 per cent above the June, 1960, level. The June breakdown: Private construction, $3.47 billion, 7 per cent greater than in May; public construction, $1.65 billion, 12 per cent more than in May. The Census Bureau reports that spending for total new construction in the first six months of this year amounted to $25.4 billion compared with $25.1 billion in the like period of 1960, up 1 per cent.

Air Force Automates Manpower Planning

The Strategic Air Command is now able to get an exact picture of its world-wide manpower needs every 24 hours, thanks to an automated system. The equipment tells the number and types of men needed, locates the men best qualified for each assignment, and gives SAC a daily projection of manpower needs six months in advance. When a man is needed, a National Cash Register 304 computer searches the files on more than 200,000 men, considers 50 different facts about each, and turns up the best man in less than 2 minutes. More than 10 million facts about SAC personnel are recorded on five magnetic tapes.

Tips for Better Surface Preparation

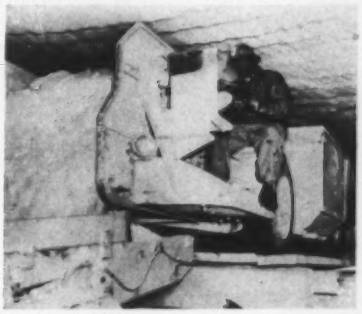
Preparing surfaces for plating, painting, and other finishes via grinding, blast cleaning, brushing, tumbling, and plating, calls for high skill. Unfortunately, practice often lags technology, say authorities like Dirck Olton, manager of product engineering, Behr-Manning Co., Troy, N. Y., a division of Norton Co. To find out what techniques will help you reduce finishing costs and improve end products, STEEL queried a number of experts in surface preparation. For their tips, see Page 70.

Recession Hits Australia

Unemployment in Australia has reached 102,000, the highest number since the depression of the thirties. Hardest hit are the auto, textile, steel, and building industries. Auto dealers are holding stocks 75 per cent below normal and 20 per cent of the auto workers have been laid off. Home building has slumped 35 to 50 per cent since the first of the year. General elections will be held before the end of the year and the recession may be fatal for the conservative Menzies government unless it introduces employment stimulants in the country's budget next August.

Shuttle Car Runs on a Battery

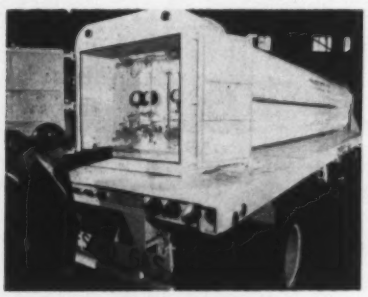
Deep beneath an ice cap in Greenland, this battery powered shuttle car dumps mined ice onto a belt conveyor. The car works two, 10 hour shifts daily during summer months on power from 80 cell, Exide, nickel-iron, alkaline batteries. Similar batteries are used to power mine locomotives and electric industrial trucks. They're also used for rail car lighting and air conditioning.



Manufacturers' Orders Hit Two Year High in May

During May, manufacturers enjoyed the highest level of new orders than in any month since mid-1959, reports the U. S. Commerce Department. The seasonally adjusted May figure, estimated at nearly $31.1 billion, peaked 2 per cent above the April level, while factory inventories showed little change. Producers of fabricated metals and building materials received substantially higher orders in May than in the previous month. Manufacturers' shipments and sales also rose 2 per cent. Backlogs of unfilled orders went up moderately to $46 billion.

New Trucks Carry Bigger Gas Payloads



Bigger payloads of compressed gases can be hauled on these white trucks. U. S. Steel's National Tube Div. designed and fabricated the 28 ft steel cylinders (24 in. in diameter) to carry helium and nitrogen at Air Force missile sites. Company officials say the units will reduce a carrier's deadload by 2116 lb, shorten downtime for required inspections.

Aussies May Get New Aluminum Smelter

A huge aluminum smelter may be built in Australia in the next two years, reports Geoffrey Hartigan, chairman, Australian Aluminium Co. Ltd. Representatives of Aluminium Ltd. of Canada and Aluminium Co. Ltd. of England, owners of the Australian firm, are exploring possibilities for an

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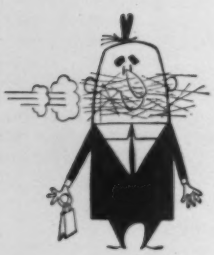
installation in Queensland, New South Wales, or Victoria. The smelter would use either nuclear power or electricity generated from Australia's brown coal.

You Have More Competitors, More Customers

In case you haven't noticed, the Commerce Department reports that you have more competitors and more customers. The number of operating companies in the U. S. at the beginning of this year reached 4.7 million, an increase of 1 per cent from the year-earlier total. The number of manufacturing firms totaled 324,000—about the same as a year earlier. During 1960, 28,000 new firms entered the manufacturing field (vs. 27,000 in 1959) and 28,000 other firms went out of business (vs. 26,000 in 1959).

Straws in the Wind



Japanese electronics output totaled $1,166 million in 1960 compared with $932 million in 1959, reports the Business & Defense Services Administration; production of consumer electronic components made up 57 per cent of the 1960 total . . . Republic Steel Corp. held the premiere showing of its film, "The New World of Stainless Steel," in Canton, Ohio, as part of the company's $1.5 million marketing program to promote greater use of stainless . . . During the first quarter of 1961, U. S. foreign payments were close to $300 million in excess of receipts, says the Office of Business Economics . . . The magnetohydrodynamic generator, which transforms heat into electricity with an estimated yield of 50 to 60 per cent vs. 40 per cent for conventional generators, may become a reality soon, says Prof. Hannes Alfven, Royal Institute of Technology, Stockholm, Sweden. He comments that materials which can withstand the high temperatures required will likely be developed . . . Spendable earnings (with federal income and social security taxes deducted) rose by 85 cents in May to $82.44 per week for an average factory worker with three dependents, announces the Bureau of Labor Statistics. The increase represented increased buying power because the consumer price index remained substantially unchanged . . . Some producers at the International Tin Council's meeting in London believe a new ceiling price (at which the buffer stock pool manager is obligated to sell) of $1.25 a pound is needed for tin. The former price was $1.10.

Metalworking Pulse

The Business Trend: STEEL's industrial production index edged up 1 point in the week ended July 1. An upswing in use of electricity counteracted a steel production downturn. **Autos:** Output tumbled in the week ended July 8 as schedules were cut back over the holiday. Many plants were closed July 3 and 4. **Steel:** With the observance of the holiday by many companies, ingot output declined for the sixth straight week. Steelmakers feel a reversal of the trend is imminent.

- **INDUSTRIAL PRODUCTION INDEX**
  (1947-49=100)
  Week ended July 1 . . . . 167†
  Year ago 150
  Details on Page 57
- **PASSENGER CAR OUTPUT (UNITS)**
  Week ended July 8 . . 75,000*
  Year ago 89,769
  Details on Page 54
- **STEEL INGOT OUTPUT (TONS)**
  Week ended July 8 1,800,000*
  Week ago 1,925,000
  Details on Page 101

†Preliminary. *Estimated.

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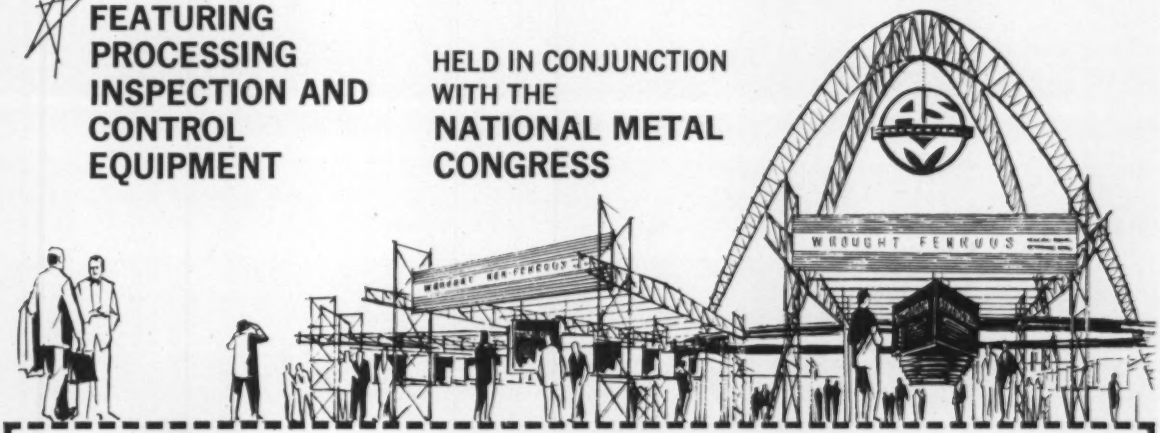

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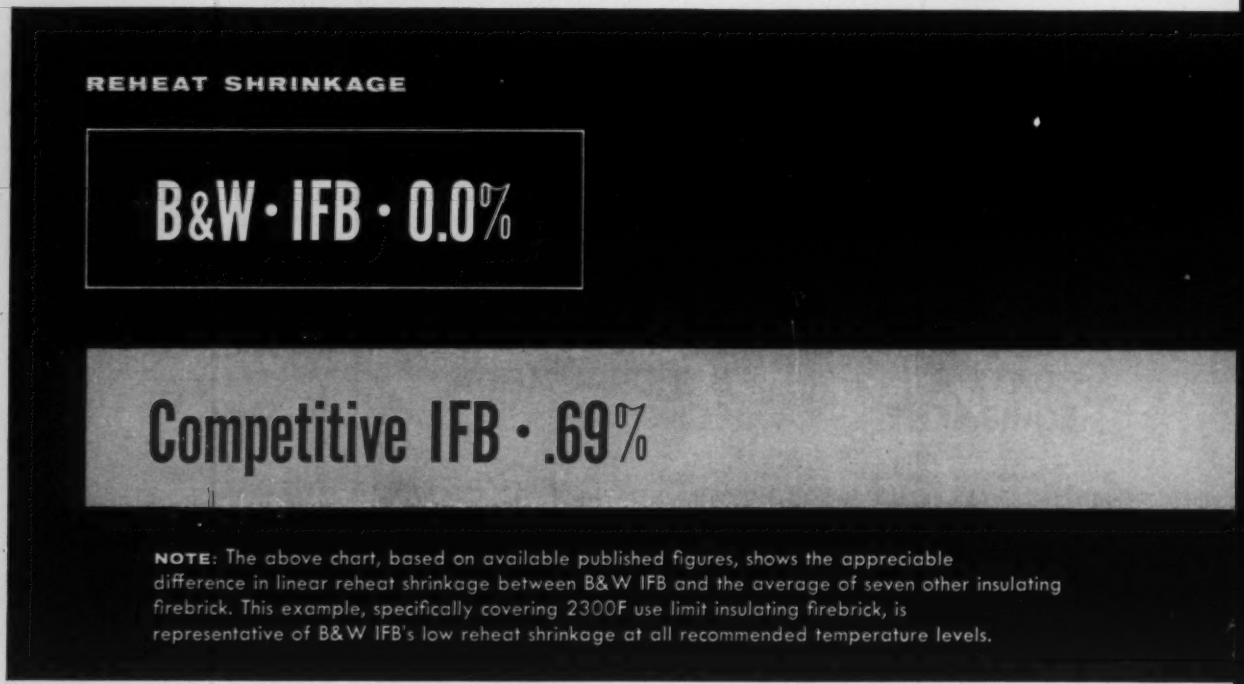
Another *plus* of Lightweight B&W Insulating Firebrick

LOWER REHEAT SHRINKAGE means MORE STABLE



NOTE: The above chart, based on available published figures, shows the appreciable difference in linear reheat shrinkage between B&W IFB and the average of seven other insulating firebrick. This example, specifically covering 2300F use limit insulating firebrick, is representative of B&W IFB's low reheat shrinkage at all recommended temperature levels.

All insulating firebrick are not the same. Published figures show wide variations in *all* of the important properties among the leading brands of brick.

Take reheat shrinkage. This important property affects furnace stability, refractory life and fuel costs. Reheat shrinkage ranges from a B&W Insulating Firebrick low of 0.0% to a high of 1.5% for competitive insulating firebrick. The closest any other IFB comes to matching B&W IFB is 0.3%.

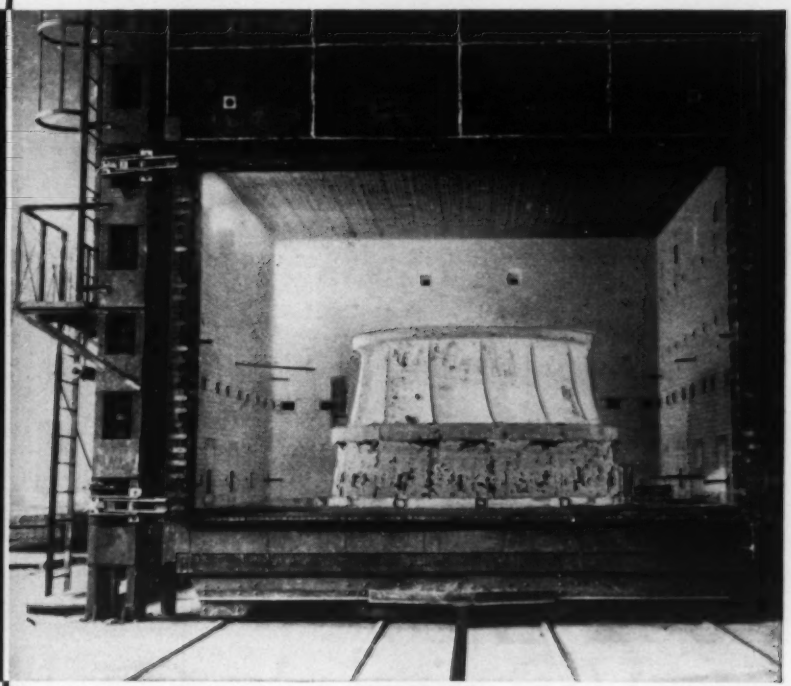
You are paying for insulating firebrick . . . make sure you get *all* the benefits. B&W—the originator of IFB—manufactures a full line of IFB with an experience-proved balance of light weight, high insulating value, high strength and long life.

For complete information on B&W Insulating Firebrick, write for Catalog R-38 to The Babcock & Wilcox Company, Refractories Division, 161 East 42nd Street, New York 17, New York.

ONE OF A SERIES

FURNACE CONSTRUCTIONS

the payoff



Stability means low maintenance —

This large car bottom annealing furnace has given years of low maintenance service because of the stability of B&W Insulating Firebrick. Furthermore, the high insulating properties of B&W IFB have resulted in lower fuel costs and close temperature control. This is just one of many proofs in our files that "there is an important difference in insulating firebrick."

n-660

B&W

THE BABCOCK & WILCOX COMPANY

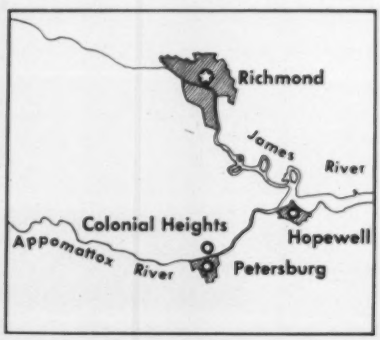
REFRACTORIES DIVISION

Single-Place Gyrocopter by Bensen Aircraft Corp.

Looking for production savings?

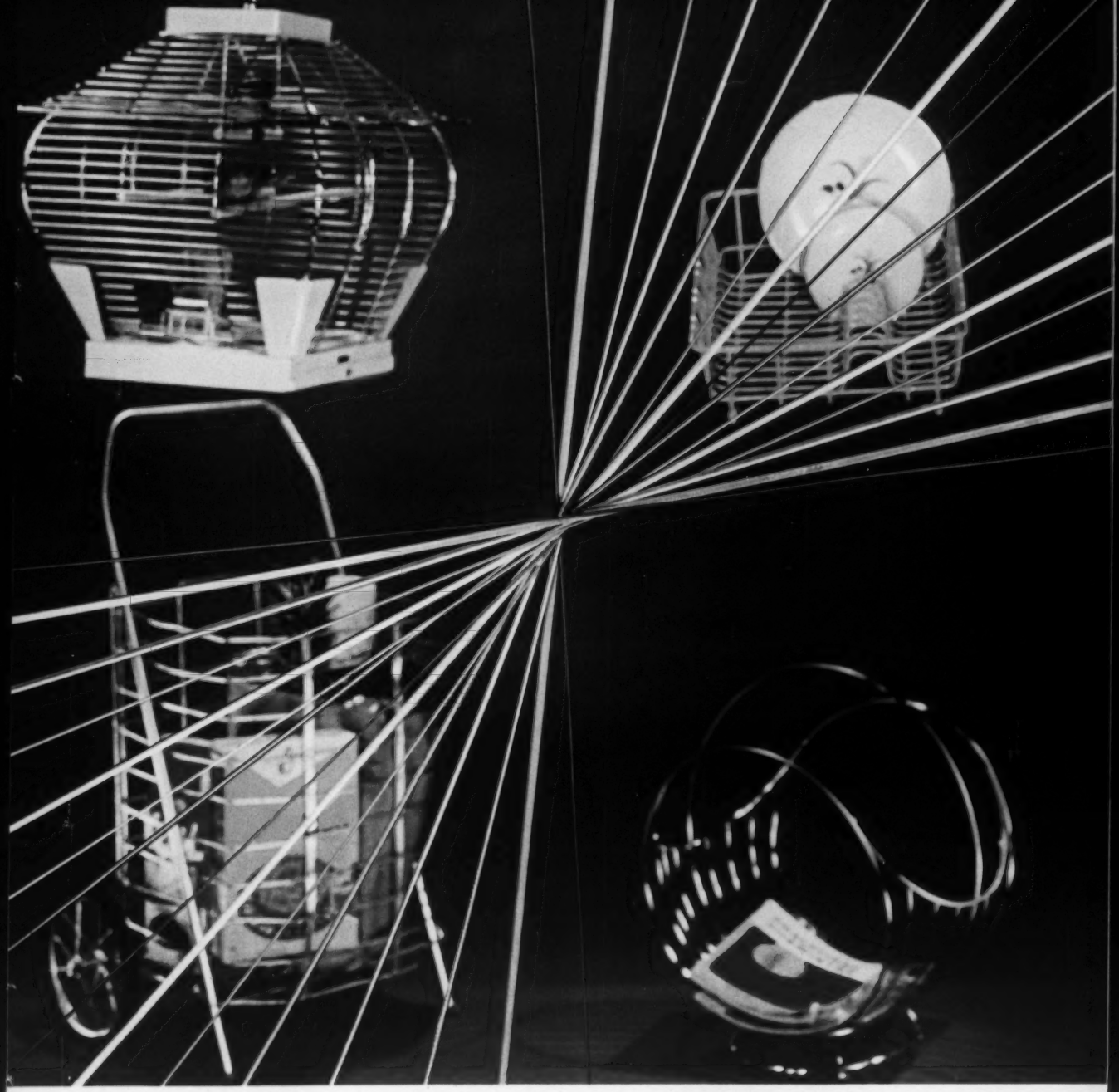
Look into Virginia's Capital Area

Every dollar saved on transportation brings down production costs. And you'll find many such savings in the Richmond-Petersburg-Hopewell-Colonial Heights area of Virginia. For here you can ship by six major railroads, plus 56 scheduled truck lines. You can enjoy excellent air service for both passengers and cargo. And there's a deep water channel for low-cost ocean freight. Ask VEPCO about other savings in Virginia's Capital Area. Write, wire or phone for site and economic data on its pleasant, conservatively-governed communities.



VEPCO VIRGINIA ELECTRIC and POWER COMPANY

Clark P. Spellman, Manager—Area Development, Electric Building, Richmond 9, Virginia • MIlton 9-1411
Serving the Top-of-the-South with 2,086,000 kilowatts—due to reach 2,720,000 kilowatts by 1963.



Need steel wire?

Bethlehem makes nearly all kinds.

QUALITIES
Industrial, cold-heading and cold-rolling, chain, stapling, ball, "scrapless" nut, upholstery spring, welding, and many others.

TREATMENTS
Annealed, lead-annealed, patented, and various special treatments to meet specific requirements.

ANALYSES
Low-, medium-, and high-carbon; many alloy grades.

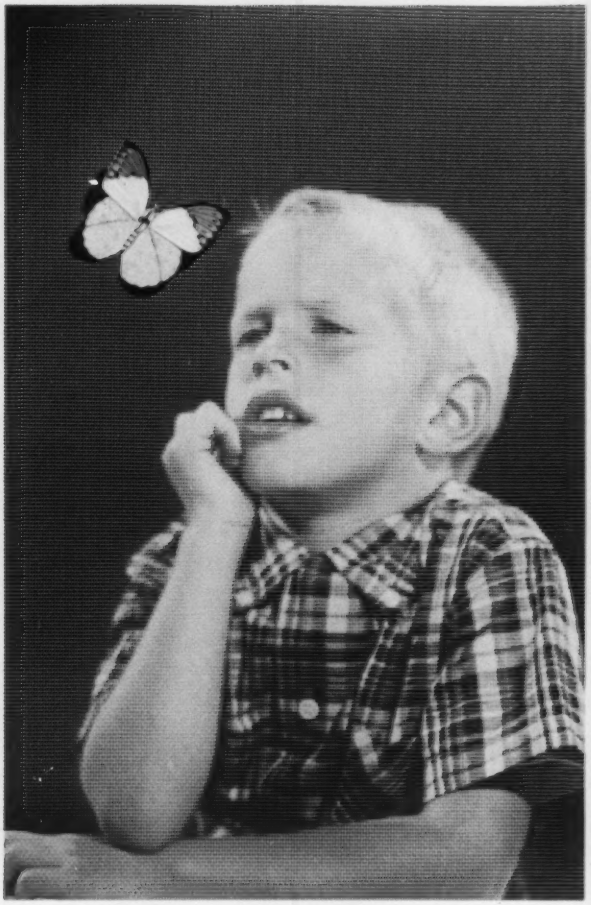
FINISHES
Bright, galvanized, Bethanized (electrolytically zinc-coated), Bethalume (aluminum-coated), limed, and many special finishes

Steel
for Strength
. . . Economy
. . . Versatility

BETHLEHEM STEEL

BETHLEHEM STEEL

Weld it... weave it...



We furnished this manufacturer just what he wanted for the special wrench being welded here—wire that is strong, easy to shape, and has a clean finish that produces a sound weld . . . *the first time.*

Using the steel grade recommended by our metallurgical engineers, this customer has been turning out top-quality wire screening for many years. The efficient operation of the wire in swift-working, automatic looms is a result of the freedom from defects which is "built into" the steel.

Whatever you do with steel wire

Bethlehem supplies steel wire for all of the various manufacturing processes from cold-heading to coiling. Our metallurgists are always available to help select the correct type of wire for your job. And they can often give you practical advice that helps to trim your production and handling costs.

Steel

for Strength
. . . Economy
. . . Versatility

form it... coil it... twist it!

Laundry and shopping carts must take rough handling, as well as resist corrosion. This wire former has found that the wire we recommended forms easily, and helps them turn out a laundry cart that is light, easy to handle, and durable.

Bethlehem designs an upholstery spring wire specifically for coil springs that hold through years of active family use. For years we have supplied leading spring-makers. These innersprings are coiled from Bethlehem Silver Star Spring Wire for a quality line of mattresses and upholstered products.

In the handy household brush Bethlehem wire is brought to the housewife's doorstep. We supply this brush-maker with an electrolytically zinc-coated steel wire which is twisted into brush handles. Bethlehem's easy-forming, bethanized wire takes this severe twisting, holds the bristles, and gives long service.

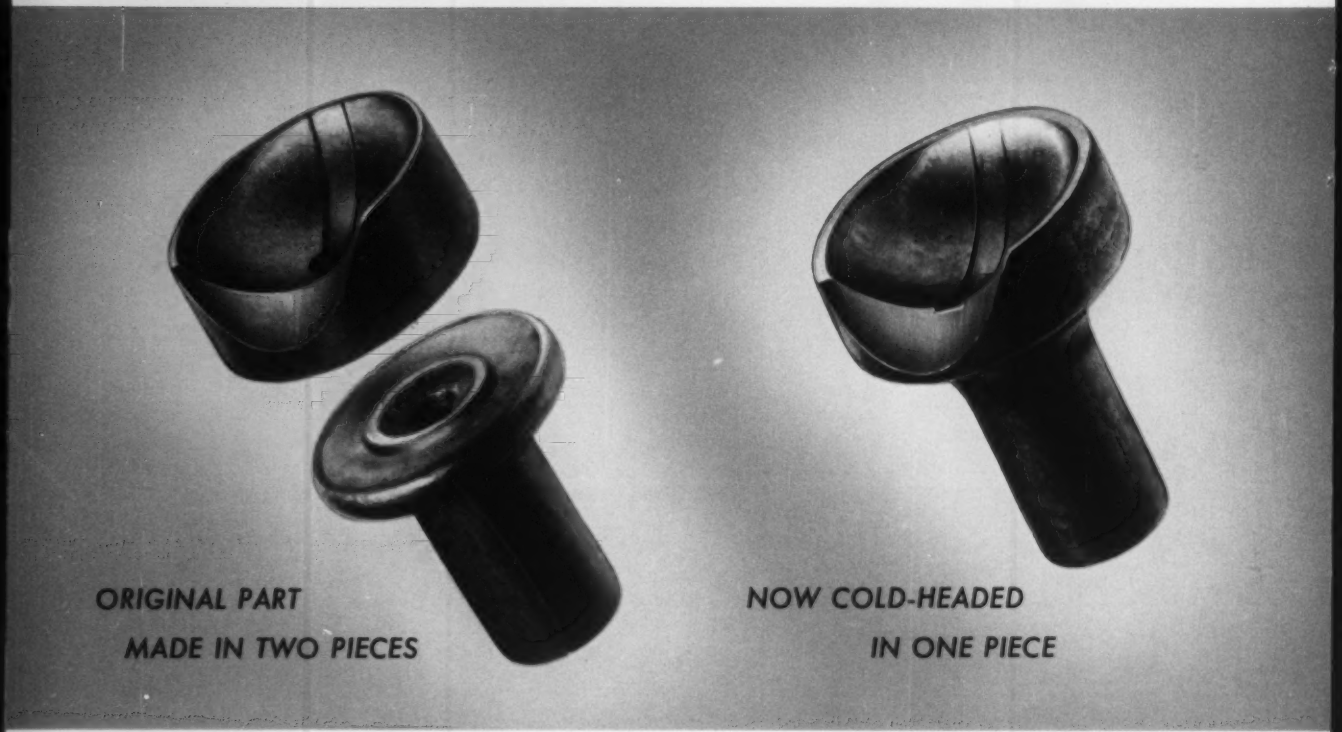
...Bethlehem can supply it

BETHLEHEM STEEL

BETHLEHEM STEEL

cold-head it...

When you're going to cold-head a product, the wire has to be just the right grade. A special type of Bethlehem cold-heading wire was developed by Bethlehem's metallurgists for this component of an automotive steering-rod relay system. The two-piece part, comprising a stud and a seat, has been replaced by a single part which is now cold-headed at a considerable savings.



Bethlehem supplies steel for virtually every use

Here's a partial list of steels and specialty products in the Bethlehem line:

BARS AND BILLETS:
Carbon and alloy AISI grades
Concrete reinforcing bars
Leaded steels
Special rolled sections

TOOL STEELS:
Water, oil, and air-hardening grades

FORGINGS:
Drop, press, hammer, and upsetter
Rolled-and-forged sections

ROD AND WIRE:
Hot-rolled rods, wire, and wire products

SHEETS:
Hot- and cold-rolled
Continuously galvanized
Enameling sheets

TIN MILL PRODUCTS:
Electrolytic and hot-dip tinplate; blackplate

PLATES:
Universal and sheared
Flanged and dished heads

WIRE ROPE AND SLINGS

FASTENERS:
Bolts, cap screws, rivets
Special fasteners

STEEL PIPE:
Continuous butt-weld
Electric resistance-weld

STRUCTURAL SHAPES

COLD-FORMED SHAPES

PALLET RACKS

WELDMENTS:
Frames, tanks, housings, vessels

FREIGHT CARS, PARTS, WHEELS, AXLES

RAILS:
Tee, crane, girder

CASTINGS:
Carbon, alloy, stainless steel
Iron, brass, bronze

Publications Dept.,
BETHLEHEM STEEL COMPANY
Bethlehem, Pa.

Please send me information on steel wire for use in .....

Also send me information on.....

.....

Name.....

Company.....

Address.....

City..... *Zone*..... *State*.....

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.
Export Sales: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

The single, most important advance in the whole history of disposable tooling

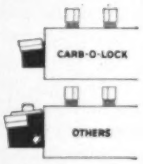
Just 3 parts (not including insert) means minimum parts inventory, greatly reduced possibility of part failure, much less downtime, lower costs.

Streamlined silhouette because "clubheads," clamps, screws are eliminated.

15 styles, 124 sizes for triangular and square inserts. Shank sizes from ½" square (replace your brazed tooling) to 2" square.

Elimination of insert pocket results in larger end-cutting angle. Can be used on many tracer applications.

Minimum overhang of Carb-O-Lock reduces space requirements for locking mechanism.



Insert changing and indexing is a breeze. Turn wrench to unlock, replace or index insert, then turn wrench to relock.

New Carb-O-Lock toolholder-insert combination cuts tool costs up to 40%!

Save 30% and more when you buy it . . . 40% and more when you use it. The key to the new Carb-O-Lock: Simplicity!

Think of it! Now you can cut your disposable tooling costs by up to 40%! You save and keep on saving, because savings are designed right into the new Carb-O-Lock toolholder-insert combination.

Truly unique in toolholder design, the Carb-O-Lock employs just three parts (not including insert)—compared with up to 12 parts in other toolholders. Using a cam-action locking principle, the Carb-O-Lock toolholder makes insert changing and indexing easy as one, two, three! And the streamlined design of this revolutionary toolholder lets you bring it closer to the work, with unrestricted chip flow.

Carb-O-Lock toolholders are available right now in toolholder shank sizes from ½" square to 2" square for square inserts and ½" to 1½" on toolholders for triangular inserts. The specially processed disposable inserts have been developed in Carboloy® Grade 883 for machining cast iron as well as many operations on high-temperature alloys, type 300 stainless steel, brass, and bronze.

They are held to tolerances of ±.002" on ¼" I.C. to ±.004" on the 1" square and they cost 40% less than some precision-ground (±.001") inserts.

These inserts have cutting edges composed of whole carbide crystals which are stress free, and notch free like Carboloy Pre-Honed inserts. And, to make your changeover easier, Carb-O-Lock inserts are designed to fit most square or triangular negative rake toolholders you may now be using.

Carb-O-Lock inserts come skin-packed on a file-drawer size, color-coded card for easier inventorying, faster identification.

See just how this brand new toolholder-insert combination can bring *better profits through better tooling* in *your* metalcutting operation. Phone your Authorized Carboloy Distributor and place your order for the Carb-O-Lock toolholder-insert combination.

Great! . . . *revolutionary!*

Metallurgical Products Department of General Electric Company, 11141 E. 8 Mile Road, Detroit 32, Michigan.

METALLURGICAL PRODUCTS DEPARTMENT

CARBOLOY
CEMENTED CARBIDES

GENERAL ELECTRIC

CARBOLOY® CEMENTED CARBIDES • MAN-MADE DIAMOND • MAGNETIC MATERIALS • THERMISTORS • THYRITE® • VACUUM-MELTED ALLOYS

How to choose a metal for sub-zero service

What metal do you use in equipment for sub-zero studies in chemistry and physics... in pressure vessels and auxiliary equipment for storage of ethylene at −155°F... in tanks and ocean-going barges that must handle liquefied gases at −258°F... in storing and piping equipment for liquid nitrogen at −320°F or liquid helium at −452°F?

Just any metal won't do: in each case the equipment must be made of a metal that retains its toughness where other metals embrittle in crippling sub-zero temperatures.

Which metal to use... and where?

2¼% NICKEL STEEL

For moderately low temperature service, this nickel steel offers a combination of good mechanical properties and superior resistance to brittle fracture at temperatures down to −75°F. 2¼% nickel steel may be found at work in refrigeration equipment, cooling apparatus, and machinery and structures in very cold climates.

Design Data

ASTM A-203 Grade	Tensile Strength psi, min.	Yield Strength psi, min.	Allowable Tensile Design Stress ASME, psi, max.
A	65,000	37,000	16,250
B	70,000	40,000	17,500

Welding Materials: For manual metal-arc welding, use low hydrogen coated electrodes of the E8015-16-18 C1 Classification conforming to AWS-ASTM specification A316. These electrodes will deposit a weld metal of essentially base metal composition.

3½% NICKEL STEEL

Low carbon 3½% nickel steel has both high strength and a resistance to brittle fracture which has led to its use as a standard material for pressure vessels operating at temperatures down to −150°F − vessels for manufacturing, storing and transporting liquefied hydrocarbons. It is also widely used in aircraft testing units and equipment for oil refinery processes.

Design Data

ASTM A-203 Grade	Tensile Strength psi, min.	Yield Strength psi, min.	Allowable Tensile Design Stress ASME, psi, max.
D	65,000	37,000	16,250
E	70,000	40,000	17,500

Welding Materials: For manual metal-arc welding, low hydrogen type electrodes of AWS-ASTM Classification E8015-16-18 C2 will deposit weld metal containing not over 0.10 carbon and 3% to 3½% nickel.

9% NICKEL STEEL

Low carbon 9% nickel steel provides an excellent combination of strength and notch toughness at temperatures down to −320°F. Specifically developed to meet engineering demands for an economically priced metal for low temperature service, this material is produced in the quenched and tempered or double normalized and tempered conditions. Operation Cryogenics has demonstrated that this material may be used safely even without thermal treatment after welding. At the present time an ASME code case is being prepared to use pressure vessels made of either of these conditions, omitting the post-weld heat treatment. 9% nickel steel is at work in equipment handling such products as liquid methane at −258°F, oxygen at −297°F, and nitrogen at −320°F.

Design Data

ASTM A-353 Grade	Tensile Strength psi, min.	Yield Strength psi, min.	Allowable Tensile Design Stress ASME, psi, max.
A	90,000	60,000	22,500
B	95,000	65,000	23,750

Welding Materials: Best results are obtained with Inco-Weld* coated electrodes or wire of a high nickel-chromium-iron composition. Inco-Weld "A" electrode is used for manual welding, and Inco-Weld "A" wire is used for inert gas welding with tungsten electrode or inert gas-metal arc welding.

304 NICKEL STAINLESS STEEL

Types 304 and 304L nickel stainless steels are very well-suited for service at extreme sub-zero temperatures down to −452°F, the temperature of liquid helium and the lowest measured service temperature. These nickel stainless steels are widely used in low temperature service because they are easy to fabricate, do not require heat treatment after fabrication, and have high strength with superior ductility and shock resistance at very low temperatures. And because of their corrosion resistance, nickel stainless steels are employed wherever high product purity and ease of cleaning following fabrication are essential − as in the handling of missile propellants. In fact, for optimum *corrosion resistance* at *any* temperature in the sub-zero range, nickel stainless steels are the best choice.

Design Data

ASTM A-240 Grade	Tensile Strength psi, min.	Yield Strength psi, min.	Allowable Tensile Design Stress ASME, psi, max.
304	75,000	30,000	18,750
304L	70,000	25,000	17,500

Welding Materials: For metal-arc welding, use coated austenitic stainless steel electrodes conforming to AWS Classification E308 ELC-ASTM A298. Inert gas-metal arc welding requires ER308L wire conforming to ASTM A371.

Cold Facts on Metal Economy

Interestingly enough, the nickel alloy steels increase significantly in strength as the temperature is lowered into the sub-zero range. For example, 9% nickel steel has a tensile strength at room temperature of 105,000 psi; at −320°F its tensile strength is 165,000 psi.

The high room temperature tensile properties of these nickel alloy steels which manifest themselves in higher code design strengths makes it possible to use thinner, more economical sections with complete safety. As the structure is cooled to its sub-zero operating temperature, the characteristic response of the nickel steels − an increase in strength while still maintaining toughness − further confirms the wise selection of these steels in sound engineering design.

LITERATURE

The publications listed below are especially recommended for guidance in selecting metals for sub-zero service.

Publication Number	Name
A269	Properties of Nickel Steel Plates at Low Temperatures
A263	9% Nickel Steel for Low Temperature Service
A278	3½% Nickel Steel for Low Temperature Service
A273	2¼% Nickel Steel for Low Temperature Service
...	Operation Cryogenics
A276	Steels for the Containment of Liquefied Gas Cargoes

A complete listing of Inco publications and technical bulletins can be obtained by writing for "List A" to:

*Registered trademark.

The INTERNATIONAL NICKEL COMPANY, Inc.

67 Wall Street INCO New York 5, N. Y.

INCO NICKEL

NICKEL MAKES ALLOYS PERFORM BETTER LONGER

Steel Price Hassle

Talk with a steel user and he probably will express confidence that prices on steel mill products will hold at present levels.

Talk with a steel producer and he likely is figuring on how soon and how much prices can be increased.

The consumer is impressed by recent cuts in certain prices—reinforcing bars, wire rope, oil country goods, and some stainless items. He notes the continuing pressure of foreign competition. He is encouraged by the apparent overcapacity of the industry and the competition of mills for his order.

The producer will note that wages have increased about 30 cents an hour since the last price increase and will go up another 10 to 12 cents Oct. 1. He is keenly conscious that for each penny he pays in wage increases, his costs for goods and services go up a cent and a half. Thus while employment costs under the contract signed in January, 1960, will have gone up 40 cents an hour by October, other costs will have increased by 60 cents an hour. About 12 manhours are required to produce a ton of finished steel. Thus cost increases approximating $12 a ton are indicated.

Steel producers' profits have been declining for several years.

The answer, as they see it, will have to be upward adjustments in prices as soon as the market will support them.

Marketing research departments in the major steel companies are convinced that operations will improve steadily through the fall and winter and will establish a favorable climate for selective price increases.

We doubt that even the steel producers have yet decided on the time and size of price increases. But we believe the steel consumer who does not figure on the probability of higher materials costs in the months ahead will be making a grave mistake.

Steel users, themselves caught in a profit squeeze and faced with continued keen competition at home and abroad, will not like the idea of higher steel prices. But as long as we permit wages to rise more rapidly than productivity, we have no alternative.

Walter J Campbell

EDITOR

This is McKay

McKAY DIE SHEAR LINES CUT MORE THAN STEEL. The most economical and efficient shear lines in operation today, they are being used by dozens of leading metal producers, fabricators and warehouses to slash shearing costs. Here, McKay Sales Manager Joseph F. Lyden, Jr., and M. G. Slaney, Building Division Manager, The Parkersburg (W. Va.) Rig and Reel Company — one of the nation's fastest growing manufacturers of pre-engineered metal buildings — examine panel sections cut to length by the high speed McKay Die Shear Line in the background.

Photo by Arnold Newman

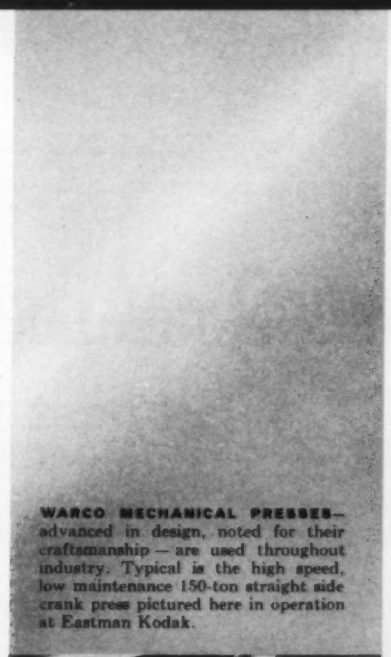
Machine....

a recognized leader in the development and manufacture of high production metal processing equipment!

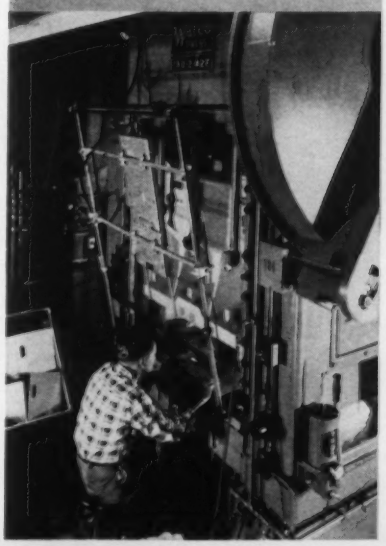
If you fabricate metals and are caught in the "profit squeeze" you'll want to know more about McKay Machine.

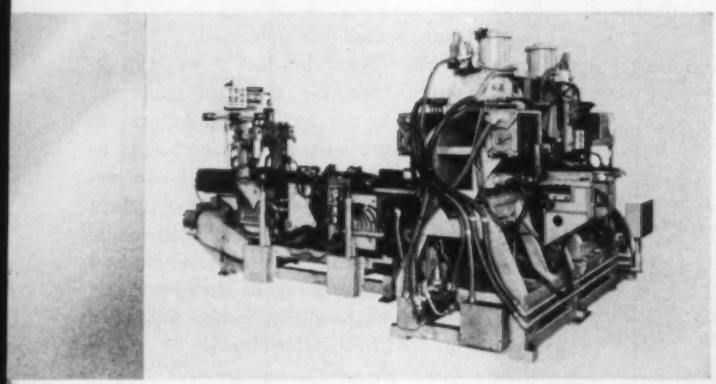
It was McKay Machine that pioneered automated integrated production lines, and it is McKay Machine that is today a leader in this field. We have conceived and produced complete lines for the manufacture of building panels, aircraft and missile sections, appliances, cabinets and components, automotive bodies and parts, and farm equipment—lines that are completely automated from *raw material to finished part or product.*

Whatever you make, if it requires metal handling, feeding, slitting, shearing, stamping, welding or forming, it's just good business to acquaint yourself with *McKay Packaged Production Lines*—high speed production equipment engineered to work in unison—with one-source responsibility from start to finish. Write for literature to *The McKay Machine Company, Youngstown 1, Ohio.*



WARCO MECHANICAL PRESSES—advanced in design, noted for their craftsmanship—are used throughout industry. Typical is the high speed, low maintenance 150-ton straight side crank press pictured here in operation at Eastman Kodak.

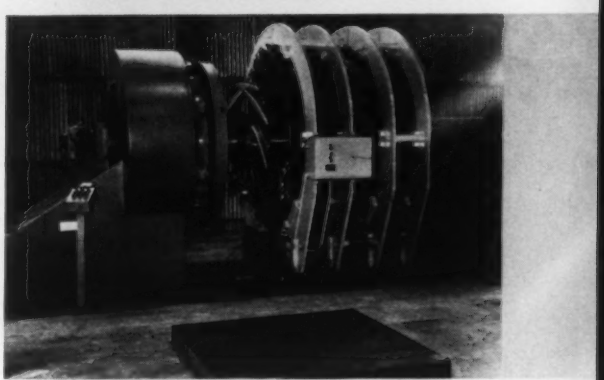




FEDERAL RESISTANCE WELDERS AND WELDING LINES, like this multi-gun combination spot and projection welder used by Hotpoint on their range production line, can be found in the plants of leading metalworking firms the nation over. Individual units, or complete resistance welding lines, are engineered to specifications by McKay's Federal-Warco Division.

LOOK TO

McKAY MACHINE



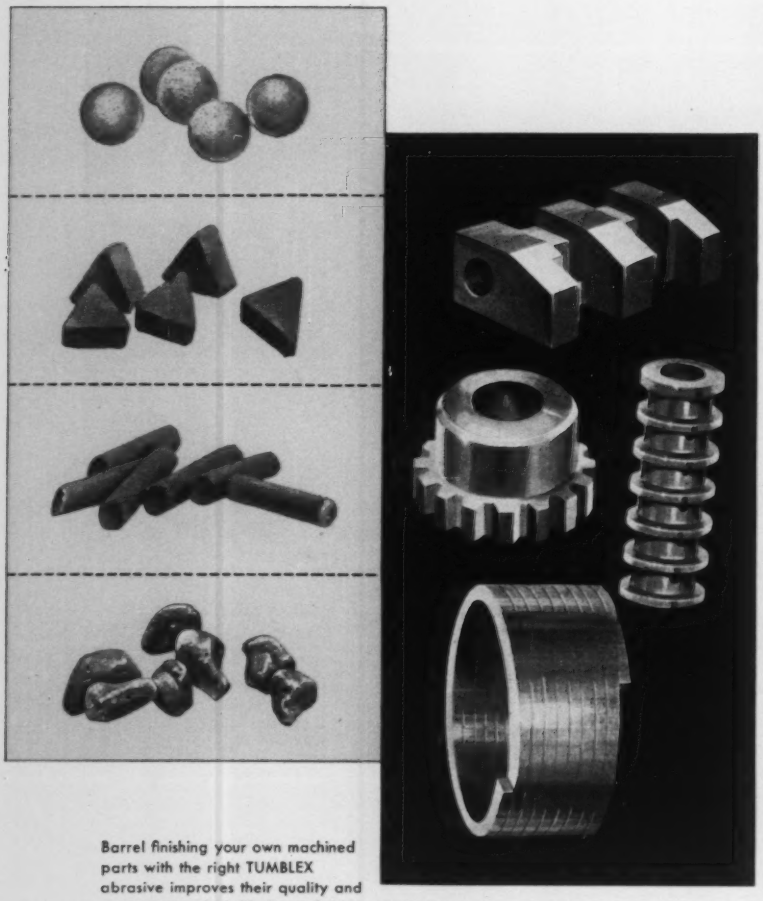
BERKELEY-DAVIS AUTOMATIC ARC WELDING MACHINERY produced by Berkeley-Davis, Inc., a subsidiary, is highly popular in the aircraft, rocket, automotive and appliance industries. The rocket body welder pictured here is working at Aerojet General, subsidiary of General Tire and Rubber Company.

Barrel-finishing is best finishing

to cut costs of your machine parts

It's common knowledge that barrel-finishing is now the one outstanding way to cut costs and improve the appearance of mass-produced parts.

If you're missing these production advantages because you've felt your own particular machined parts may be too delicate and complicated . . . too big and heavy . . . or not the right material . . . this message is for *you!*



Barrel finishing your own machined parts with the right TUMBLEX abrasive improves their quality and appearance. And this faster finishing can cut your cost-per-piece produced.

The fact is that barrel-finishing with Norton TUMBLEX* abrasives is your surest, quickest way to remove burrs, provide uniform radii, improve surface finish and increase the fatigue strength of the parts *you* are machining.

The variety of materials, sizes and shapes covered is practically unlimited. Materials include ferrous, non-ferrous, and modern space alloy metals — also plastics and many other non-metallics. In sizes, anything from tiny roller bearings to aircraft wing spars can be handled. And shapes can be the most complicated ever processed.

For your product's eye-appeal, barrel-finishing provides excellent finish. Lower handling costs are assured by the barrel-finishing ability to combine several operations — deburring, breaking sharp edges, surface finish refinement, etc. — at the same time. In addition, your barrel-finished machined parts can be plated without burnishing or buffing — and welded or brazed after simple cleaning.

Get complete proof. Send sample parts to our Sample Processing Department. We'll barrel-finish, return samples and report the methods and abrasives you need for new production advantages. NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors around the world.

*Trade Mark Reg. U. S. Pat. Off. and Foreign Countries.

NORTON
ABRASIVES

G-419

Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Non-Slip Floors — BEHR-MANNING DIVISION: Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

Steel Price Hikes Are Coming

STEEL BUYERS, watch for two things this fall:

1. A probable increase averaging $4 to $5 a ton in base prices of selected forms around Oct. 1.

2. A lengthening of leadtimes on deliveries.

The two things are interrelated. A pickup in business, accompanied by an extension in delivery periods, is expected this autumn. (Gross national product is climbing again and intensive studies indicate it will continue to new highs. Forecasts put gains at 7 per cent during the next year and 12 per cent by 18 months from now.) The developments could give producers the courage to increase prices.

● **Decisions, Decisions**—Courage is the right word because they will be faced by many weighty decisions. They must consider: Strength of demand for steel and the strength of the economy generally; competition from imported steel and other materials, such as nonferrous metals, plastics, glass, paper, wood, and cement; political pressures (threat of censure or investigation); and the impact of a price increase on public opinion and on next year's labor negotiations in the industry.

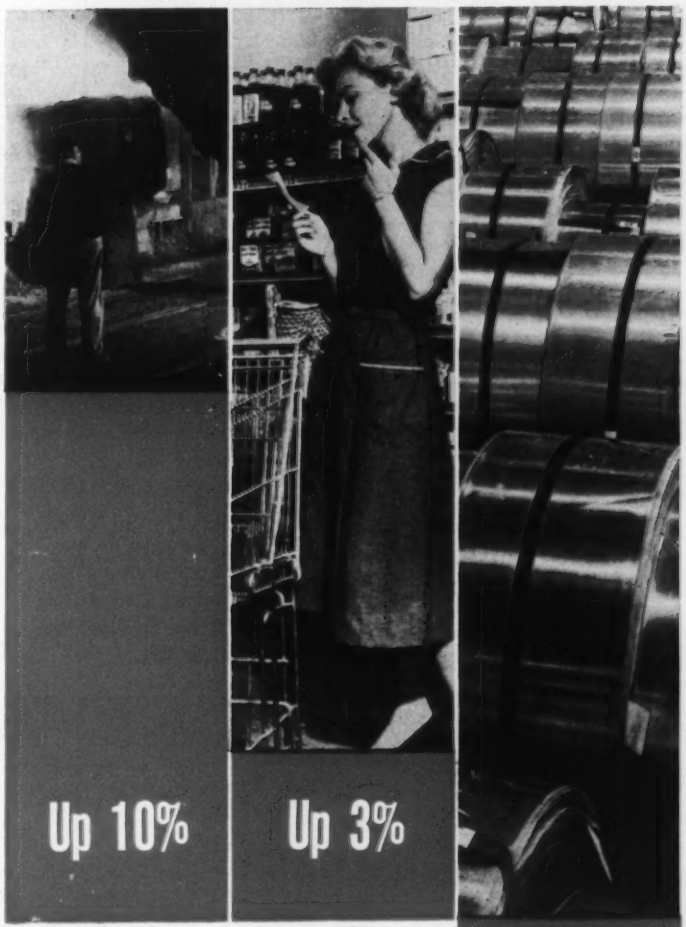
Timing and methods will also be knotty problems.

First, should the industry hike prices around Oct. 1, or wait until a new labor contract is signed next year?

Second, would a delay until a contract signing in mid-1962 provide opportunity for a more adequate price increase than could perhaps be obtained around Oct. 1?

Enhancing the steel industry's position to raise prices is the developing prospect of a price increase on aluminum in the fourth quarter (see Page 116), and a rise of about 10 per cent in the price of nickel on June 30. The nickel price boost,

Changes Since Last General Steel Price Increase, August, 1958


Up 10%
Up 3%
Wages, Benefits
Living Costs
Down 6/10%
Steel Prices
Wages, benefits – total hourly cost per production worker in steel industry
Living Costs – based on Bureau of Labor Statistics consumer price index
Steel Prices – Finished steel price index, Bureau of Labor Statistics

How Steel Prices Compare*

(Week ended June 28, 1960, vs. week ended June 27, 1961)

Prices Have Gone DOWN on These Products	Amount of Decrease
Reinforcing Bars	$4.70 per ton
Cold Rolled Stainless Sheets (Type 302)	$30.00 per ton
Cold Rolled Carbon Strip	$5.28 per ton
Cold Rolled Stainless Strip (Type 430)	$40.00 per ton
Black Buttweld Pipe	41c per 100 feet
Galvanized Buttweld Pipe	48.7c per 100 feet
Line Pipe	$4.103 per 100 feet
Carbon Oil Well Casing	$8.048 per 100 feet
Alloy Oil Well Casing	$12.61 per 100 feet
Stainless Mechanical Tubing (Type 304)	$11.34 per 100 feet
Barbed Wire	4.2c per 80 rod spool

Prices Have Gone UP on These Products	Amount of Increase
Galvanized Sheets	16c per ton
Woven Wire Fence	90.7c per 20 rod roll

Prices are UNCHANGED on These Products

Railway Materials
Carbon Plates
Structural Shapes
Tool Steel Bars
Hot Rolled Alloy Bars
Hot Rolled Stainless Bars (Type 303)
Hot Rolled Carbon Bars
Cold Finished Carbon Bars
Cold Finished Alloy Bars
Cold Finished Stainless Bars (Type 302)
Hot Rolled Carbon Sheets
Cold Rolled Carbon Sheets
Electrical Sheets
Hot Rolled Carbon Strip
Boiler Tubes
Carbon Mechanical Tubing
Hot Dipped Tin Plate
Electrolytic Tin Plate
Black Plate
Drawn Carbon Wire
Drawn Stainless Wire
Bale Ties
Wire Nails

*Products are those on which the U. S. Bureau of Labor Statistics computes average prices (they include mill base prices and typical extras and deductions).

the first in 4½ years, was attributed to climbing costs.

• **Competition Will Rule**—An across the board increase in steel prices is unlikely. Despite any strengthening in demand, there will be variances in competitive conditions surrounding the various forms of steel.

Because of keen domestic competition and substantial imports, reinforcing bars would be one of the products least likely to be increased. Keen competition among stainless steel producers and brisk competition from aluminum would argue against a further increase on stainless. (Nickel bearing grades of it went up from 1 to a little more than 2 per cent immediately after the June 30 boost in the price of nickel. Stainless producers explained that this compensates only for the nickel price increase and does not cover accrued increases in the cost of making steel.) Squeezed by imports, U. S. producers of merchant wire and even some of the manufacturers' wire items would find it difficult to raise prices.

• **Watch These Products** — Under less competitive pressure are such big tonnage products as hot rolled and cold rolled carbon sheets, plates, and structurals. They would be likely candidates for increases. (Those products account for around 47 per cent of U. S. mill shipments of finished steel.)

Hot rolled carbon merchant bars might be included, but they are not in the favorable position of the products just named. Bar mills in large steel companies have had an increase in open time since imports and small domestic producers took a big portion of the reinforcing bar business. (Rebar imports into the U. S. in 1960 were equal to 23 per cent of U. S. mill shipments of the product.)

Reasons like those indicate that any price increase this year, or even next year, will be on selected products. And any revision would most likely be applied to price bases rather than price extras.

• **Leadtimes**—Longer leadtimes are expected this autumn because of the anticipated improvement in business and an accompanying gain in steel usage. Users will find that their reduced inventories will be inadequate to support an accelerated rate of usage. Their stepup in ordering will put enough of a load on mills to stretch out delivery times.

Look for leadtimes to lengthen further shortly after Jan. 1 as steel buyers start to build inventories as protection against the possibility of a steelworkers strike at midyear. (The present labor contract expires June 30, 1962.)

• **A Long Wait**—Producers contend that for almost two years they could have justified increases to help compensate for additional employment costs. But they have not felt that the time has been right. The last general adjustment (averaging $4.50 a net ton in base prices) was in August, 1958, a month after a wage increase to steelworkers. A wage increase followed on Dec. 1, 1960, and there will be another one

on Oct. 1, 1961. In addition, fringe benefits (like insurance and pensions) have gone up.

Since the last general increase in steel prices, the hourly wages and benefits per production employee in the U. S. steel industry have risen 10 per cent (see chart on Page 35). But a price index computed by the Bureau of Labor Statistics shows the price of finished steel has gone down 0.6 per cent.

• **Exceeds Living Cost**—The rate of rise in steelworker employment costs far exceeds the 3 per cent gain in the government's consumer price index (cost of living) since August, 1958.

The decline in the BLS steel price index is almost wholly the result of recent price reductions on reinforcing bars, stainless steel, and some tubular goods. (For details on decreases, see table on Page 36.)

While the recent price decreases have been centered in products that comprise only a small percentage of all finished steel, their occurrence does nothing to enhance a climate for price increases.

• **Part Payment**—A $4 to $5 a ton price increase would compensate producers for only part of the inflation in production costs stemming from increased employment costs. One major producer figures that for every penny increase per hour in steelworker wages other steelmaking costs go up 1.5 cents.

It has been estimated that employment costs for hourly employees in the industry will have gone up an average of 40 cents an hour during the life of the present labor contract. So add 60 cents for other steelmaking costs, and the total increase in the cost of making steel is $1 an hour.

• **Parallel Pressures** — Commenting on costs and prices at the annual meeting of Republic Steel Corp. stockholders in May, the company's president, Thomas F. Patton, said: "Since 1958 in particular we have felt the parallel pressures of constantly rising costs and competitive factors which have limited our ability to raise prices.

"This situation has taught us an important lesson. It demonstrates that even with an intensive cost reduction program, a company cannot successfully cope with substantial increases in employment costs, as well as other rising costs, and still maintain reasonable profit margins unless there is some compensating price increase."

Net profits per dollar of sales in the steel industry have declined each year except one since 1955. In the one exception (1957), there was an infinitesimal increase.

• **See Bigger Output** — The expected improvement in the business climate is causing producers to make upward revisions in their estimates of this year's steel ingot production. Joseph L. Block, chairman, Inland Steel Co., Chicago, expects ingot output to be in the neighborhood of 100 million to 105 million tons—around 45 million tons in the first half, 55 million to 60 million tons in the second. "This," Mr. Block pointed out, "would be an increase of nearly 30 per cent from the first to the second half, and would make 1961 about 5 per cent better than 1960—and the best year since 1957."

• **Near Record Rate**—Mr. Patton has said that he expects the weekly ingot output in the nation in the first half of 1962 to approach 2.4 million tons. He thinks production in the July, 1961, to July, 1962, period may be close to the record (117 million tons in 1955).

While part of the strengthening will come from inventory building, the major portion will stem from upward trends in capital expenditures, construction, and consumer durable goods, Mr. Patton declared.

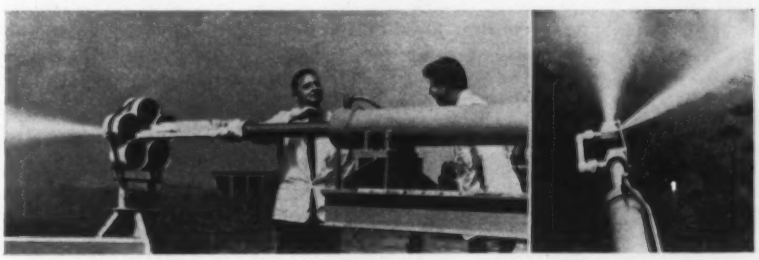
Mr. Block commented: "The current recovery is brisk and appears to be broadening in all three major sectors of the economy. Government spending is obviously headed upward, business expenditures are expected to improve, and the consumer seems to be losing some of his recent reluctance to purchase durable goods. Most forecasters are predicting that industrial production will be above previous record highs by the end of 1961.

"This should mean a significant increase in steel consumption and additions to steel inventories by our customers to support their rising sales and manufacturing activities."

• **Ample Melting Capacity** — The expected improvement in steel demand will not overburden the melting capacity of the U. S. steel industry. The various methods of using oxygen to melt steel have substantially boosted capacity.

The squeeze will come in finishing. It's already evident in galvanized sheets. The earliest that one major producer can supply them is seven weeks.

If a price increase were placed on galvanized sheets Oct. 1 and if the leadtime should become no longer than seven weeks, an order would have to be placed no later than the second week of August. That's only a month from now.



Liquid Lathes May Cut, Shape Metals

LIQUID under extremely high pressure is delivered in a needle point jet by the liquid lathe, a tool that may have a future in the cutting and shaping of metals. Current models, which cut wood, concrete, and plastics, were developed and manufactured by Abrasi-Jet Machine Tool Corp., Glendale, Calif., under license from Navan Products Inc., El Segundo, Calif., the invention marketing subsidiary of North American Aviation Inc.

As auto talks open, UAW's Reuther jabs these points at automakers . . .

- **Union demands can be met without boosting car prices**
- **Don't tamper with cost of living or annual improvement factor**
- **Salaries for workers will eliminate "double standard treatment"**

Shadow of U. S. Joins Auto Talks

THE SHADOW of the federal government was conspicuous at the opening of the auto industry's labor contract negotiations.

Both the United Auto Workers and the automakers wasted no time in proclaiming their concern over inflation and negotiating a settlement without government intervention.

And serving to reinforce an earlier administration warning that a "strike will be intolerable," President Kennedy last week set the Taft-Hartley, 80 day, cooling off period machinery to work in the maritime strike.

The pressures on the bargainers are not too different from those of the 1958 sessions when the autoworkers developed a war of nerves by working from June into September without a contract. The economy was in a recession then and the pressure was on the bargainers not to thwart any chances for a fall upturn—which didn't materialize.

But this year, the recovery is definitely underway and the President isn't waiting for public pressures to build—he's been emphatic that he doesn't want the boat rocked. Contracts expire at the end of August and if the war of nerves waiting game of '58 is repeated, it'll begin just as the nation gets set for the fall business impetus.

Despite his "hopes to settle without help from Washington," Walter Reuther, head of the UAW, might welcome federal intervention if the going gets too difficult, speculate some labor observers. That would permit him to make Labor Secretary Arthur Goldberg and the administration scapegoats for any shortcomings in the settlement.

Major verbal blasts followed UAW presentation of its opening proposals to Ford Motor Co.

Mr. Reuther said the industry should be able to meet the union's demands without inflicting higher car prices on the public. "We want to gain our equity out of the fruits of technology, not out of higher prices," he said. Kenneth Bannon, director of UAW's Ford department, joined the attack by assailing the profits and executive salaries at Ford. He said the $356 million the company earned in 1960 represented a 16.7 per cent return on investment. "If Ford had taken a 9.5 per cent return, the average for U. S. manufacturing, the retail price of every Ford car could have been cut $81 and still left 58 cents per hour for each of Ford's 113,000 UAW members."

Malcolm L. Denise, Ford's labor relations vice president, commented that continued government intervention in collective bargaining could mark the end of the free competitive system. "Detractors hold that bargaining has failed . . . it is

our job to prove them wrong . . ."

At General Motors Corp., the UAW presented a starter list of proposals, including the expected demand for salaries for hourly workers. "There is no justification for this double standard of treatment," union leaders claimed. "Insecurity resides in paying workers by the hour or fraction of an hour." Other proposals submitted by the union included:

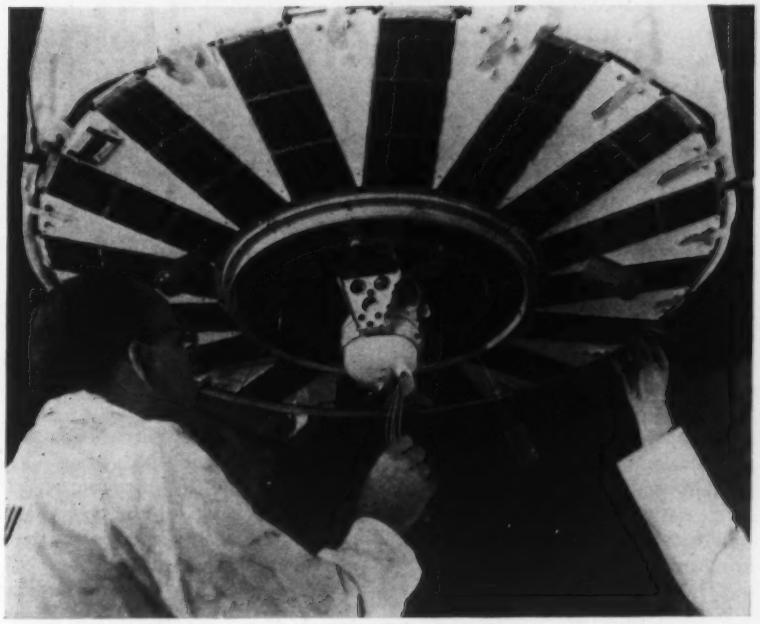
1. Extended supplemental unemployment benefits.
2. Broader transfer rights.
3. Seniority protection during layoffs.
4. Shorter probation periods.
5. Racial nondiscrimination clauses.
6. Hospital and medical care paid in full by the company.

Mr. Reuther was emphatic about two provisions: "We will make it clear that cost of living and annual improvement clauses are essential . . . and we do not intend to tamper with them." Autoworkers' straight time pay now averages about $2.80 an hour, excluding fringe benefits but including 17 cents in cost of living increments. The annual improvement factor provides a 2½ per cent or 6 cent (whichever is larger) increase per year.

● **No Break for Chrysler** — Even though Chrysler Corp. reported a $22 million loss in the first quarter and expects a slightly smaller loss in the second period, Mr. Reuther said that "as long as L. L. Colbert's salary is not below pattern, we don't intend to allow production workers to go below pattern either."

Bargaining opened last Thursday at American Motors Corp. UAW Vice President Norman Matthews said it might be possible to negotiate a contract with AMC before the rest of the industry signed. He added: It could be a pattern setter that would be followed by the Big Three.

Edward L. Cushman, AMC's bargaining vice president, is already on record as saying he'd like to ditch the escalator clauses. He has said that salaries for hourly workers aren't feasible, but the company has investigated the idea of a profit sharing plan—a provision Mr. Reuther was touting loudly in the early stages of the 1958 bargaining sessions.



Navy's navigational satellite carries . . .

Atomic Power into Space

A TINY nuclear power source built by Martin Co.'s Nuclear Div., Baltimore (see photo), was successfully launched into space June 28 by a 50 ton Thor-Able-Star rocket. The SNAP (System for Nuclear Auxiliary Power) device was attached to a Navy Transit navigational satellite. It is the first use of atomic power in space, and forecasts much larger auxiliary power sources for use in manned spacecraft. The radioisotope fueled, thermoelectric generator contains no moving parts and directly converts heat (produced by radioisotope decay) into electricity. The copper housed, grapefruit-sized generator will last perhaps five years, says the Atomic Energy Commission.

● **SPACE BUDGET AT $3 BILLION**—Roswell L. Gilpatric, deputy defense secretary, figures the U. S. will budget more than $3 billion for space in fiscal 1962, including $1.8 billion for the National Aeronautics & Space Administration, $1.1 billion for the Defense Department (better than 90 per cent of that for the Air Force), and about $140 million for agencies like the Atomic Energy Commission and Weather Bureau.

● **ARMY COMMUNICATIONS SATELLITE**—Advent, an Army managed active communications satellite system, is being built by General Electric Co.'s Missile & Space Vehicle Dept., Philadelphia. Instantaneous, world-wide, military communications are the primary goals for the microwave system. Three satellites will receive, amplify, and relay messages to ground receiving stations on land and at sea. Power will come from solar energy converted into electrical energy by thousands of silicon photovoltaic cells built into two paddles extended from the satellites. Nickel-cadmium batteries will supply power when the satellite is on the shadow side of the earth.

● **DEFENSE SIDELIGHT**—Defense Secretary Robert McNamara has revealed the U. S. is considering the purchase of some British defense products, as we interest them in buying our B-52 fired Skybolt missile. Item for discussion: British engines for our S/VTOL (short and vertical takeoff and landing) aircraft now on the drawing boards.

O. R., Computers to Help Future Marketers Keep Pace

THE MARK of a successful marketing manager in the future will be his ability to compete effectively with other managers using computers and operations research (O. R.) techniques. So spoke Nicholas F. Pensiero, manager, marketing administration, Computer Div., Willow Grove, Pa., Philco Corp., at the 44th national conference of the American Marketing Association in Los Angeles.

"The application of nonscientific principals, historical data, or operations by the seat of our pants cannot fill the (marketing) bill in the era of high technical skills," he said.

"Operations research can provide you with a better and more practical basis upon which to make marketing decisions. Computers offer the best possible means to put O. R. to work. Now that O. R. techniques have translated marketing situations into mathematical formulas, we need not be burdened with . . . the use of hand methods and slow tabulating machines for finding solutions to problems," he noted.

• **Computer Application**—Pointing out that computers allow for immediate solutions and provide ability to explore alternative courses of action, Mr. Pensiero presented this example of the computer's role in marketing: It could handle point of purchase analysis for a corporation with sales areas and warehouses throughout the world. The computer would process orders, provide an analysis of all items ordered, note their frequency of order, pinpoint the areas of popularity, and spotlight rarely ordered items. The amassed information would provide the corporation data for rescheduling and rearranging warehouse inventories according to product demand. The results would also give the company knowledge of customer desires, and assist it in planning sales programs and production.

• **Programing Medicos**—Mr. Pensiero also related the use of a computer by Smith, Kline & French Laboratories, manufacturing pharmacists in Philadelphia. The firm has set up a master tape with information on 180,000 doctors in the U. S. A general profile of each doctor has been established, using ages, specialties, and 25 other sets of criteria. The basic information is expanded by periodic reports from salesmen. Likes and dislikes are noted. Personality indexes for the doctors and the company's salesmen could be recorded.

With this information fed to a computer, the pharmaceutical house learns who should get direct mail and where sales promotion efforts should be concentrated. Payoff: It takes most of the guesswork out of sales planning, increases business expansion possibilities, and gives more sales effort per dollar.

• **Other Applications** — Mr. Pensiero cited other tasks that could be undertaken by the machines: Application of linear programing to a sales distribution problem; selection of sites and personnel for large, complex businesses, like chain stores; show how alternative allocation of funds would affect expansion of a business.

Strikes at 3 Year Low

ALTHOUGH strike activity rose seasonally in April, the total was the second lowest for the month in the postwar period. (The low: April, 1958.)

About 320 stoppages, involving 94,000 workers, were added to a carryover of 140 in March, bringing the number of workers involved to 126,000.

Strike idleness during the January-April, 1961, period accounted for 3.4 million mandays vs. 5.9 million in the like period of 1960, says the Department of Labor.

Here's Where O. R. Can Aid Marketers

"ALTHOUGH operations research techniques have been used for many years in marketing research analysis, they are comparatively new to marketing management," says Philco Corp.'s Nicholas F. Pensiero. "Some areas of marketing defy quantitative analysis, but operations research techniques, when used properly, could help." To name a few:

- **Price policy and application to the product line.**
- **Measuring advertising payoff.**
- **Selection of the proper advertising media.**
- **Distribution cost analysis.**
- **Analysis of new product proposals.**
- **Effective marketing simulations.**
- **Marketing experimentation and analysis.**
- **Measurement of customer changes.**
- **Development of models of customer activities.**
- **Locating salesmen.**
- **Market location analysis.**

New System Translating Russian to English Unveiled

A SYSTEM using electronic computers to translate Russian into English at 60,000 words per hour has been developed by Machine Translation Inc., Washington.

Mrs. Ariadne Lukjanow, president of the firm and inventor of the system (called Unified Transfer System), says it is designed for use on general purpose computers and can translate any language into another so long as one is an Indo-European tongue. The system has been demonstrated on IBM 7090 and C-E-I-R Inc. 7090 equipment.

During the next year, translation speed is expected to be increased to 150,000 words per hour. The forthcoming IBM STRETCH computer may be able to translate as many as a million words per hour. Although present translations are highly acceptable, the test model uses only half the linguistic rules required for high quality translation. The remaining rules are prepared and will be phased into the final production system.

Machine Translation has built a Russian-English dictionary of 5000 Russian and 32,000 English words for general purpose translation. Within a year, the size of the dictionary will be increased tenfold. Translation of scientific and technical texts will require preparation of special supplementary dictionaries.

• **How It Works**—The Unified Transfer System punches Russian text on IBM cards and transfers the information to magnetic tape which is fed to the computer simultaneously with the taped dictionary and program codes. The computer performs the translation and prints out the English version.

Mrs. Lukjanow says, "This important scientific advance establishes American leadership in the field. The Soviet Union has had more than one thousand persons engaged in research on machine translation for several years." Machine translation is important to the U. S., she notes, since less than 10 per cent of Russian scientific and technical data is available to U. S. scientists and less than 0.09 per cent of Russian publications is translated for our intelligence agencies. A leading Soviet publication announced the first Sputnik several months before launching but U. S. scientists and intelligence officials did not have a translation of the article until several months after the launching.

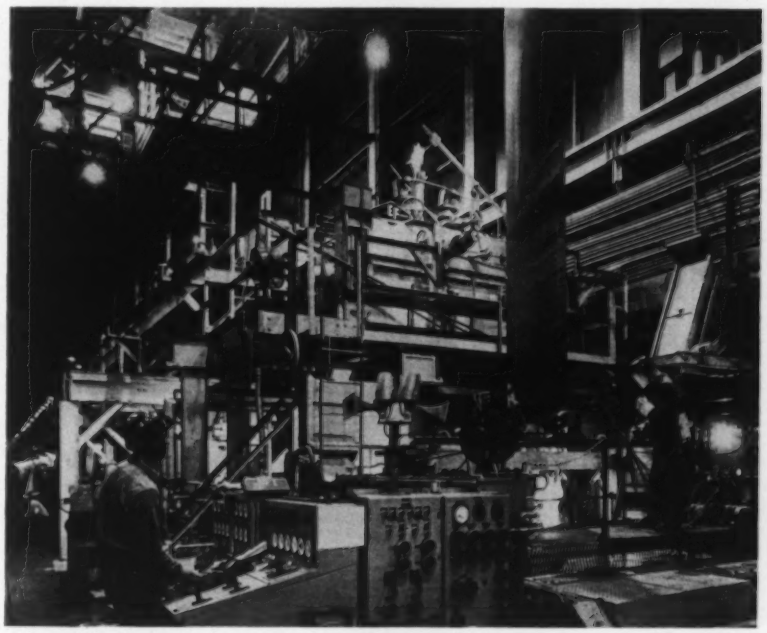
Mrs. Lukjanow's company hopes to translate, print, and distribute Russian newspapers on the same day they are published in Russia.

Looking ahead, Mrs. Lukjanow sees one or two central translation centers in this country which will be able to translate all necessary foreign books and newspapers into English and U. S. publications into other languages.

Boost in Powder Metal Use?

AUTOMAKERS will double their use of iron base powder metal parts during the next five years, asserts W. P. Balthrop, president, Chrysler Corp.'s Amplex Div. Their use has grown 300 per cent since 1954.

Amplex can turn out more than 40 million parts a month. They range from 11/16 to 30 in. in diameter and weigh up to 350 lb. Typical uses include small regulator gears and self-lubricating bearings. Chrysler Corp. cars use an average of 103 different powder metal parts.



Galvanizing Line among New Inland Facilities

THIS GALVANIZING LINE, fourth at the Indiana Harbor Works, Inland Steel Co., East Chicago, Ind., has gone into production. By changing the "pot"" containing the metal bath, steel may be coated with aluminum or zinc. Other new facilities at the Inland plant: Equipment for producing tin coated steel in coils and thin tin (roughly half the thickness of conventional tin plate), a sintering plant said to have added 300,000 tons or 10 per cent to the capacity of the company's eight blast furnaces, and a mile long conveyor which has tripled the coal unloading capacity of the Indiana Harbor Works.

Cloak for Red Bloc Traders Pledged by Hodges . . .

Progress Report on Revamping of Regulatory Agencies

U. S. TRADERS with Communist Bloc countries will be protected from publicity by the Commerce Department, Secretary Luther H. Hodges promises. The decision follows exporters' complaints that the department was violating the intent of the Export Control Act by releasing information obtained in the process of granting licenses.

On Capitol Hill, anti-Red trade legislators have sought through publicity to inhibit such trade.

Secretary Hodges has promised Congress that only the following information will be made available on export licenses approved:

1. A general description of the article approved for export.
2. The amount approved.
3. The country of designation.

Commerce plans to issue a daily list of licenses granted for export to any country in the world. (The list may average 500 licenses a day.)

● **THE SECRETARY'S REASONING**—Secretary Hodges says: "I do not think that giving publicity to the names of individual exporting firms will contribute to the national welfare, and in fact, I am convinced that such publication might very well have the opposite result." He reasons publicity will reveal confidential, commercial information to a firm's competitors. Speaking directly to the issue of Soviet trade, he notes: "Individual business firms should not . . . be subjected to censure for carrying on a legitimate business activity authorized by federal law and specifically approved in individual export license cases by federal officials."

Significance: One exporter recently caught in the crossfire between Congress and Commerce has said he will never again apply for a license to export to the Communists. Others have told STEEL the bad publicity costs more than the trade is worth. With the secrecy rule in effect, they may feel more able to compete with Europeans who are already trading heavily with the Reds.

● **REVAMPING REGULATORY AGENCIES**— Congressional approval of reorganization plans for the Federal Trade Commission and the Civil Aeronautics Board will allow them to give their chairmen more power, including the right to delegate some decisions to civil servants. The White House recommended the plans to reduce the tremendous backlogs of cases built up in most of the agencies.

Congress has rejected similar White House proposals for the Federal Communications Commission and the Securities & Exchange Commission, but may itself write reform plans not too different. Republicans pretty consistently have opposed the President on the ground too much power would end up in the hands of the White House, which makes appointments to the agencies.

FTC has already moved to get rid of its 18 month backlog. Chairman Paul Rand Dixon will supplant the Bureaus of Investigation and Litigation with two new bureaus: One to handle restraint of trade matters, the other to take up deceptive practices cases. Two other new bureaus will be set up to handle textile and fur labeling and run the investigations performed by the FTC's ten field offices. A special division in the new Restraint of Trade Bureau will handle the enforcement of laws prohibiting illegal mergers and interlocking directorates.

All members of the National Labor Relations Board have endorsed the President's plan for that agency, which would permit it to limit review of unfair labor practice cases heard by its 64 trial examiners. Now, a full scale review takes place when requested by any party to a case.

● **SBA TACKLES TWO PROBLEMS**—Increasing participation of small firms in federal research and development programs and more help to small companies that want to get into the export business are promised by the Small Business Administration's chief, John E. Horne. The administrator is worried that small firms got only 3.4 per cent of the Defense Department's research dollar in fiscal 1960 compared with 5.7 per cent in fiscal 1956.

The National Aeronautics & Space Administration awarded 15 per cent of its research dollar to small business in the first nine months of fiscal 1961.

Mr. Horne has induced the Army and Air Force to give SBA advance information on future research contract awards. In May, the SBA gave Defense the names of 260 possible small business research contractors.

As part of the national effort to boost U. S. exports, Mr. Horne's agency has conducted two pilot conferences and plans to establish a full time staff for small business exports.

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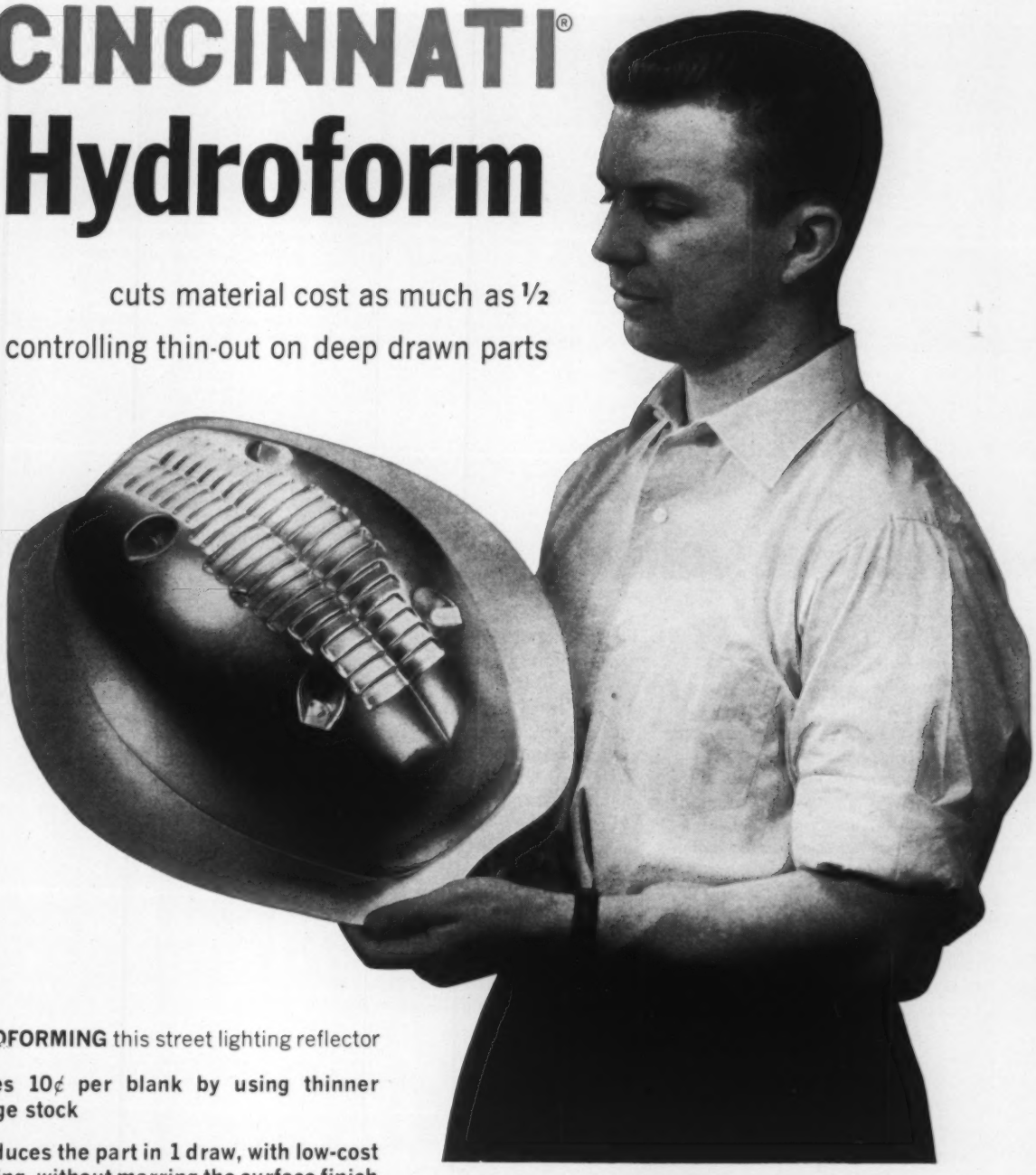

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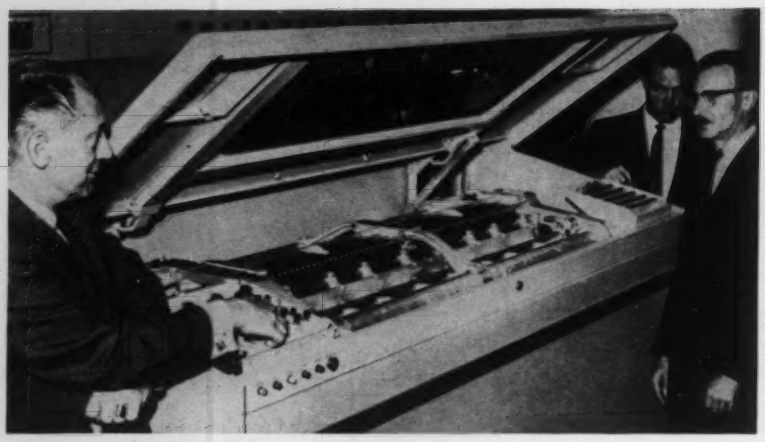


Railroad joins communication units, computer and . . .

Keeps Tabs on 50,000 Cars

THE DENVER & Rio Grande Western Railroad says it can locate any car on its line at any time in less than 1 minute. Although more than 50,000 cars operate each month on the company's 2400 miles of track, determining the status of a specific car is a matter of seconds (the job used to take days) thanks to an information system called Shipper Facts.

Combining high speed facsimile, microwave, and teletype equipment with a Burroughs 220 computer, the company can keep an up-to-the-minute account of all its operations.

Thousands of waybills, containing information on every shipment, and train movement data are transmitted over a microwave network (erected by Motorola Communications & Electronics Inc., Chicago) to any or all of six facsimile points in Colorado and Utah. The facsimile equipment (developed by A. B. Dick Co., Chicago) allows Rio Grande to transmit documents of any length and reproduce exact copies at "fax" stations in 6 seconds. A copy of the waybill is transmitted from the Denver headquarters to the original terminal to accompany the shipment. When the shipment has reached its destination, the waybill copy is "faxed" back to the headquarters where a freight bill is prepared.

At the computer center, information is stored and updated every 4 hours to reflect train movements. Since information can be recalled in 15 to 30 seconds, a customer can quickly learn the status of his shipment. Information may also be sent automatically over leased Western Union lines to traffic agencies throughout the U. S. to keep shippers and receivers informed on the progress of shipments.

Fast checks on carload inventories of principal terminals provide yardmasters a complete picture of the business on hand so they can move cars efficiently.

The information service permits Rio Grande to control operating expenses on a day to day basis. Rentals owing other railroads for the use of their cars and the rentals due for use of its cars by other lines can be tabulated daily rather than on the conventional monthly basis. The computer still has reserve capacity for storing other information, such as that needed to project earnings, prepare reports on tonnages and commodities, and write payrolls.

Railroads Plan Study Of New Freight Concept

A RADICALLY new kind of freight train that should greatly reduce costs of moving bulk commodities will be studied by 35 railroads, including all major Eastern lines.

The cars will be of high capacity (up to 25,000 tons of a single commodity per trainload) and semipermanently coupled so the train will never be broken up in service. Diesel locomotive units, similar to those now hauling fast freight trains, will be used. But instead of attaching all diesel units to the front, the units will be spaced through the train. Controls will be actuated in unison by means of electrical cables stretching the length of the train which will have identical control cabs at either end. Thus, the train can be operated in either direction without being turned around.

The trains would operate at high speeds on a terminal to terminal basis, eliminating much of the yard classification and train makeup responsibilities connected with conventional train operation.

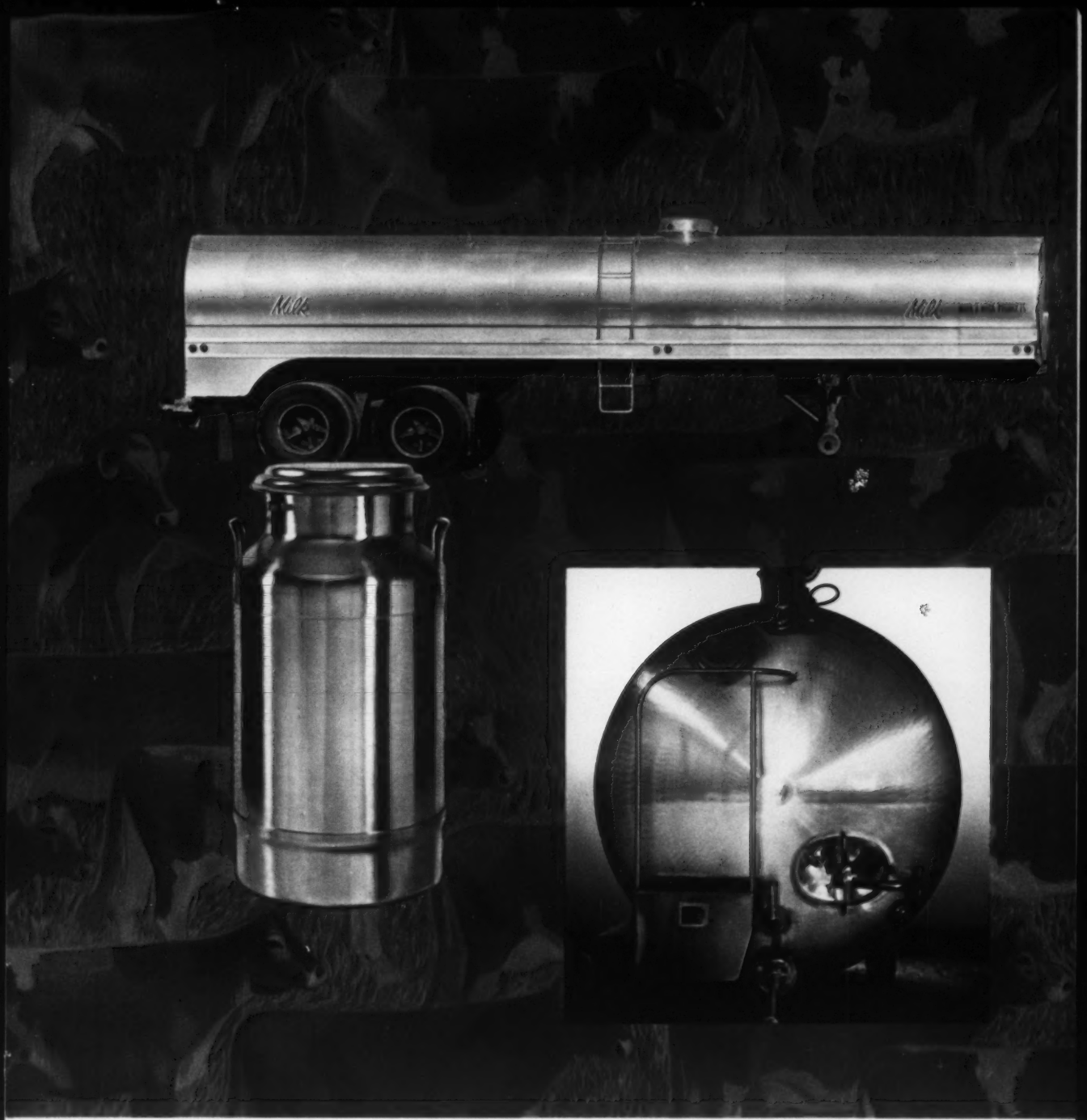
The study, conducted by the Theodore J. Kauffeld consulting engineering firm, New York, will initially be confined to transportation of coal to major bulk consumers.

Puerto Rico Enacts 13 Year Tax Exemption

PUERTO RICO is offering a 13 year exemption from income, property, and municipal taxes for industries which locate in "less developed" cities and towns. The legislation covers both local and outside companies.

Previously, the commonwealth granted ten year exemptions to new industries regardless of location, but the new tax program is aimed at stimulating activity in areas where unemployment is highest. During the last ten years almost 800 factories have been established in Puerto Rico, but unemployment still averages 11 to 13 per cent of the labor force. Studies show that 43 of the 76 municipalities have extensive untapped labor forces and can offer plant sites, power, water, and other facilities, including access to seaports.

Nearly any type of manufacturing activity is eligible, but companies which close plants in the U. S. and re-establish them in Puerto Rico do not qualify.



Grade "A" down the shipping line

Few applications demand so much from a metal as those in the dairy industry. Equipment which comes in contact with milk must be completely corrosion-resistant, easy to keep hygienically clean, and practically indestructible. For years many metals were tested and today, from milk pail to bottle-filler, virtually every piece of equipment used in the handling and processing of milk is made of stainless steel.

Product reliability like this depends on uniformity of both materials and production—the reason J&L stainless is bought regularly by dairy equipment manufacturers. J&L delivers quality consistently, order after order, to help you send Grade A products down the shipping line.

Get consistent quality stainless steel from your J&L distributor, *as* you need it, *when* you need it. He can also provide technical assistance.

Jones & Laughlin Steel Corporation

STAINLESS and STRIP DIVISION · DETROIT 34

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SHEET · STRIP · BAR · WIRE

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Because of the severe destructive effects of flux used in aluminum and copper brazing processes, proper alloy selection and quality construction are the only answers to long belt life in this type of operation. Cambridge Cambriloy 35-19 Metal-Mesh Belts have successfully withstood flux attack in many copper brazing installations for as long as 6000 hours, giving users continued production of quality parts while cutting operating and maintenance costs.

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What You Should Know about Belgium . . .

Market, Rival, Investment Base

This report, prepared by STEEL, is based on "Rundt's Market Report No. 312," May 23, 1961, issued by S. J. Rundt & Associates, New York consultants on international business, whose "Market Reports" and "Weekly Intelligence Briefs" are used by hundreds of blue chip corporations engaged in international trade and leading banks here and abroad.

BELGIUM is becoming more and more important to U. S. metalworking—as a market, a competitor, and an investment base.

The country faces some thorny problems—political, economic, and sociological. But they will gradually be overcome. A sound industrial and agricultural base and a realistic, hard working populace, coupled with good natural resources and an essentially stable administration, make the country a sure bet for future growth.

• **After Congo Crisis**—The surprisingly good recovery that Belgium made after the Congo debacle is indicative of the nation's vitality. In 1960, global trade expanded to a new record, despite a 12 per cent dip in U. S. purchases. International reserves remained high and the franc (despite brief weakness) continues to hold firm. Industrial production (excluding construction) rose a comfortable 8.7 per cent above the 1959 mark.

Gross national product (GNP) rose 4.8 per cent to an estimated $12.5 billion.

Private investment expanded by 13 per cent during the year. The industrial production index (1953 =100) averaged 126 in 1960. Wholesale prices rose by a little more than 1 per cent and retail prices also edged up. (The cost of living figure is one of the highest in Europe, although it was one of the lowest before World War II.)

Despite such impressive gains, the Congo crisis had a sharp impact—and its effects have not completely subsided. Total Belgian investments in the Congo amounted to nearly $4 billion or about 8 per cent of over-all Belgian assets. It's too early to tell what portion will be lost. Roughly 5 per cent of the government's revenue had come from the Congo. Exports to the Congo, which have been declining since 1957, may fall even more, but Belgium has demonstrated that she can compensate that loss with gains in sales to other markets.

The Congo crisis produced a psychological shock to the Belgians that will perhaps be harder to overcome than the economic setback. The impression that Belgium was one of the most successful colonizers in the world melted away. Mistakes were suddenly overemphasized and brought under the grueling light of world opinion. Says Mr. Rundt: "There can be no doubt that the Belgians will overcome the material loss of the Congo. Whether they will soon be able to swallow all their resentments remains to be seen.

"No longer an empire, Belgium must get used to the idea that she is only a small country, with limited resources, surrounded by industrial giants. To regain her buoyancy, Belgium must go more modern. The country's economic structure needs overhauling and strengthening. Basically it is viable and sound.

"But, paradoxically, Belgium today is suffering from her relatively good luck during World War II. The nation came out of the war with an almost undamaged industrial plant. During the early postwar years, Belgium set the pace for recovery in Western Europe. But she did not qualify for the huge sums of Marshall Plan aid that helped France, Germany, the Neth-

What Belgium Buys from Us

This list of major U. S. metalworking exports to Belgium gives some indication of the metalworking products which will easily find markets in that country. For detailed data, ask your Commerce Department field office for Part 3 of the World Trade Information Service's Statistical Report on Belgium-Luxembourg.

In Millions of Dollars	1960	1959
Total	423.3	325.3
Metals	20.3	21.1
Iron & Steel Mill Products	5.9	8.3
Nonferrous Ores & Metals	8.3	8.1
Machinery & Vehicles	109.2	70.3
Electrical Machinery	10.6	12.4
Machine Tools	1.3	1.1
Autos & Parts	27.1	21.1
Aircraft & Parts	21.7	5.4
Tractors & Parts	2.0	1.4
Photographic Goods	3.4	2.3
Musical Instruments	3.5	3.5

Quick Facts on Belgium

POPULATION

The 1959 estimate is 9.4 million. Density is 769 per square mile (vs. 61 in continental U. S.). About 2 out of 5 Belgians live in the immediate vicinity of the five major cities: Brussels, Antwerp, Liege, Charleroi, and Ghent.

LANGUAGE

Flemish and French are official. In international commerce, French and English are in principal use. German is widely understood in commercial circles. Many Belgian firms have letterheads printed in English. For centuries, there has been some antagonism between the Flemings and the Walloons (French speaking people). When talking with Belgians, the topic of the language row requires much tact. Advertisements may be in either idiom (when localized), or in both. Some publications have both French and Flemish editions.

CURRENCY

The Belgian franc (Bfr.) has a par value with the International Monetary Fund of 1 Bfr. equal to 2 cents. The currency is rather steady, near par, on open markets at home and abroad. It is intrinsically stable and backed by high reserves in gold and convertible foreign exchange.

INDUSTRY

Coal (which accounts for 14 per cent of total production), basic metals (16 per cent), and textiles (12 per cent) are the three principal industries. Other major industries include metalworking, chemicals, paper, flat glass, cement, and diamonds.

INVESTMENT CLIMATE

"Favorable," says S. J. Rundt. Foreign interests enjoy the same rights as domestic firms. Capital transfer, dividend remittances, repatriation, and profit extrication represent no problems at all and are unrestricted, Mr. Rundt reports. Taxation is moderate; manufacturers get concessions in the form of long term, low interest credit and tax advantages under the investment law of July, 1959. Belgium is a traditional free trader, with low or no import duties on raw materials. The nation has a highly skilled labor pool, an excellent location, a first-rate transportation system, good communication facilities, free port accommodations, and outstanding banking facilities, Mr. Rundt notes. He says the country as an investment base for U. S. firms "is of importance as are few others of comparable territory and population."

AREA

It's 11,779.2 square miles, somewhat larger than Maryland.

RELIGION

Ninety-five per cent are Roman Catholic; 5 per cent other.

GOVERNMENT

A constitutional monarchy, with a king and a prime minister.

COMMUNICATION

About 1 million telephones, 2.3 million radios, and 450,000 TV sets.

EDUCATION

About 13,600 primary and preprimary schools, with about 1.3 million students; about 3500 secondary and technical schools with about 340,000 students; twenty higher educational institutions with around 30,000 students.

erlands, and Italy replace their bombed out industries with new, modern plants. It is now Belgium's turn to modernize, mostly with her own money."

• **The "Loi Unique"**—A step in the right direction was taken late last year, when the since ousted government of Prime Minister Gaston Eyskens proposed an omnibus bill which has been passed into law. Called the "Loi Unique," it sets up these goals:

1. Economic expansion — The GNP growth rate is to reach 4 per cent annually, up from the 2.35 per cent average of the 1953-59 period. The coal mining industry and the deficit ridden, state run, railways are to be reorganized. A 15 year program of public works, totaling $4 billion, is to be carried out.

2. Employment—The national employment service is to be reorganized and full employment will be reached via the creation of 20,000 new jobs annually during the next five years.

3. Social security—In the last five years, the government's contributions to social security have soared from 18 per cent of the total to 40 per cent (or $300 million). The typical Belgian worker receives an assortment of welfare benefits, which makes him more affluent, on the average, than his European confreres. (Net per capita income in Belgium in 1959 totaled $1190 vs. $1140 in West Germany, $1055 in France, and $960 in the Netherlands.) Belgians receive such employer-supported benefits as "family allowances" (about $107 per year per child), "holiday pay," ($100 per year), "old age pensions" (about half the annual wage), "medical aid" (refunds for medical and hospital expenses), and unemployment compensation (about 40 per cent of salary, with no expiration date). Modifications became necessary in the last two categories.

4. State finances—Tax revenue is to be raised $132 million and spending is to be lowered $210 million. Inheritance taxes are boosted 10 per cent and the turnover tax (levied on manufacturers and distributors) is raised from 5 to 6 per cent. Corporation taxes on undistributed profits will be increased from 28.6 to 30 per cent; on distributed profits, the hike will be from 45.3 per cent to a maximum of 47.2 per cent. Tax relief on new investments and loans at reduced rates have been continued.

The new regime of Theo Lefevre has announced that it will continue the program. It also plans to introduce a bill to reduce taxes on capital gains from reinvested earnings.

• **Industrial Activity** — Industrial production (excluding construction) rose 8.7 per cent last year, despite a tapering off in the last quarter. A good year is shaping up. Order volume is satisfactory and Belgian planners hope to expand plant utilization and increase employment. Unemployment remains a problem. At the beginning of this year, 132,000 Belgians (5 per cent of the work force) were reported out of jobs or working part time. Coal miners bear the brunt. Metalworking employment rose 4 per cent last year; steel industry employment, 3.8 per cent; construction employment, 7 per cent; and textile industry employment, 4 per cent.

Industrial workers' wages rose an estimated 3 per cent last year, but the actual cost to employers in the manufacturing industries, went up by 4.2 per cent (some social benefits granted are not included in wage statistics).

• **Steel**—The Belgium-Luxembourg Economic Union (BLEU) is continental Europe's third largest steel producer (after Germany and France). On a per capita basis, BLEU's steel output is the highest of any nation in the world. In 1960, Belgium produced 7.8 million tons, up nearly 800,000 tons from the 1959 mark. Luxembourg added another 4.46 million tons (up from 4.04 million), for a BLEU total of 12.3 million tons—an increase of 11 per cent from the 1959 mark. BLEU accounted for 16.8 per cent of the European Coal & Steel Community's steel production. The industry is operating at about 95 per cent of capacity.

By the end of 1963, Belgian steel capacity will reach 9 million tons. Last March, work began on a new steel complex, a $140 million undertaking by Societe Metallurgique d'Esperance Longdoz at Chertal, north of Liege. The facility will employ about 1500, have 900,000 tons capacity. Longdoz, in a 50-50 venture with Allegheny-Ludlum Steel Corp., is planning to build a specialty steel mill near Genk, estimated to cost about $25 million. And later this year, construction will begin near Ghent, where Belgian, French, and Luxembourgian firms will build an integrated mill with capacity between 1.25 million and 2 million tons.

• **Metalworking** — Belgian metalworking maintained high activity last year. In the first three quarters, orders booked totaled $1.27 billion (vs. $1.12 billion a year earlier).

• **Investment**—Belgium has a keen interest in technical knowhow, in new techniques, in patent rights, in royalty and licensing agreements, in new production processes, and generally, anything that will enhance industrial diversification.

The kingdom's concentration of industrial production in coal, basic metals, textiles, and foreign trade makes it more sensitive to recessions than most other European nations. Belgium must, therefore, seek greater diversification.

More than 330 U. S. companies have business operations in Belgium. Their investments are estimated at more than $300 million vs. a mere $65 million in 1950. During 1960, 48 U. S. firms established operations in the kingdom (30 were manufacturing ventures). Metalworking operations accounted for 42 per cent of last year's total new U. S. investments, and primary metal ventures accounted for another 16 per cent. The influx of U. S. firms last year created jobs for 4195 persons—up from 1635 in 1959, when 28 U. S. firms opened operations in the kingdom. About half the U. S. companies in Belgium have their own plants. Practically all subsidiaries and branches of U. S. firms are incorporated under Belgian law, primarily for tax reasons. Under some conditions, Belgian corporations also obtain favorable treatment in government contracts.

• **Investment Help**—The Belgian government has developed several schemes to attract new industries. Much of the program is geared to

attracting foreign capital. Inducements are provided in the fields of credit policy, tax relief, and direct grants to acquire fixed assets. Official subsidies permit credit institutions to grant industrial expansion loans at low interest rates—4 per cent maximum and as little as 1 per cent during "periods of low economic activity." The government may also build plants and lease or sell them to private firms. Emphasis is on attracting automation, electronics, and petrochemical industries.

Additional benefits are available if you will invest in underindustrialized or industrially declining areas. There, all types of investment are given the minimum interest rate. And the government is empowered to give direct grants for part of the investment—up to 20 per cent of the cost of buildings and up to 7.5 per cent of the cost of equipment during normal times. During a "recession," grants go up to 30 per cent (buildings) and 10 per cent (equipment). Depreciation laws also are liberal.

• **World Trade**—Belgium's economic health is highly dependent upon the economic conditions and well-being of the nations which are its principal customers—the Netherlands, Germany, France, and the U. S. A business slump suffered by any one of them not only cuts export earnings, but deeply affects the kingdom's major industries—in fact, the over-all economy. That's especially true since more than half of Belgian export receipts are accounted for by metals, textiles, and coal—commodities invariably hit by recessions. Belgium exports about 40 per cent of her national output.

Belgium is the world's No. 1 trader on a per capita basis. In 1960, her sales and purchases abroad combined amounted to roughly $811 per person (vs. $744 for the Netherlands, $404 for Germany, $292 for France, and $92 for Japan).

• **Top Market**—To maintain her high rate of exports, Belgium must import on a large scale. So the nation is an A-1 market. Belgian imports from the U. S. last year topped deliveries to Australia by 15 per cent. Major U. S. exports to Belgium are raw materials, vehicles, capital equipment, and foodstuffs (see table on Page 47).

Belgium's world-wide imports and exports rose about 14 per cent last year. Prospects for 1961 are promising and point toward a further rise in international trade, says Mr. Rundt.

Germany is Belgium's foremost supplier, accounting for nearly 17 per cent of the country's imports. The Netherlands is second, followed by France, the U. S., United Kingdom, and the Congo.

The Netherlands is Belgium's No. 1 customer, followed by Germany, France, and the U. S. Our purchases from Belgium fell last year from the towering height reached in 1959, when Belgian steel helped to fill the gap created by the lengthy U. S. strike.

BLEU exports to the Congo dipped 34 per cent last year (to $58 million), following a 24 per cent drop the previous year. Imports, however, rose 33 per cent to $260 million.

• **Export Aid**—To offset the Congo losses, Belgium is making every effort to open new export outlets and is pushing industrial development. Creditexport, a semipublic institution, is granting loans up to five years, and the period will be extended. Trade mission activity is being stepped up. Cheap money facilities have been brought into play to aid the export drive. The bank rate for bills drawn for export has been lowered from 5 to 4 per cent.

The 5 per cent rate remains in effect for imports.

• **Common Market**—The European Common Market is widely supported by Belgians, since some three-fourths of the country's industries benefit from it. But to expand the high rate of exports to ECM partners, Belgian manufacturers must find ways to stay competitive.

• **Benelux**—The customs union of Belgium, the Netherlands, and Luxembourg (Benelux) was transformed into a full-fledged economic union Nov. 1, 1960. The three countries are determined to co-ordinate economic matters such as monetary and budgetary policies, equalization of wages and social benefits, and the solution of communication problems.

The few remaining hurdles will be eliminated: 1. By Nov. 1, 1963, all invitations to tenders, issued by national, provincial, or local authorities, will be open to bidders from all three countries. 2. All remaining restrictions on transportation will be eliminated on the same date. 3. By Nov. 1, 1965, all discrimination pertaining to the establishment of business by the national of one country in another will be eliminated. 4. The free flow of farm products will be effective on the same date.

• **Communist Trade**—BLEU trade with the Communists is increasing, but it's still relatively small in direct dealings. However, if resales, reroutings, and indirect traffic via the Antwerp free port are included, the volume becomes much larger. Antwerp is probably one of the leading transshipment points, as well as the center of "redocumentation," for all sorts of East-West exchanges.

• **Shippers' Terms**—U. S. shippers' terms to BLEU customers have been materially liberalized in the last few years. The trend is slowly continuing in some categories though terms have been tightened in others, such as autos. There is still a considerably high volume of letter of credit shipments, but that is largely customary and does not impinge on the excellent standing of Belgian buyers, whose payment record is first rate. "Relaxed terms should be granted to good BLEU traders for the asking, particularly on consumer items and capital goods," says Mr. Rundt.

• **Consumer Goods**—Belgians are steadily increasing their demand for consumer goods; sales rose 10 per cent last year. Installment buying climbed 20 per cent above the 1959 level. More than 900,000 cars are on Belgian roads—plus 370,000 motorbikes and 250,000 motorcycles and scooters. Car sales reached a record last year. On a per capita basis, Belgians drink more beer than the citizens of any other country, which should interest canmakers.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

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In many applications, Rodney's bright annealed stainless steel makes polishing unnecessary. For example, 300 Series Stainless Steel is available in dead soft temper with a mirror finish on both sides.

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K. FALCK-PEDERSEN tells how Lindberg equipment helps produce gears for high-pressure pumps

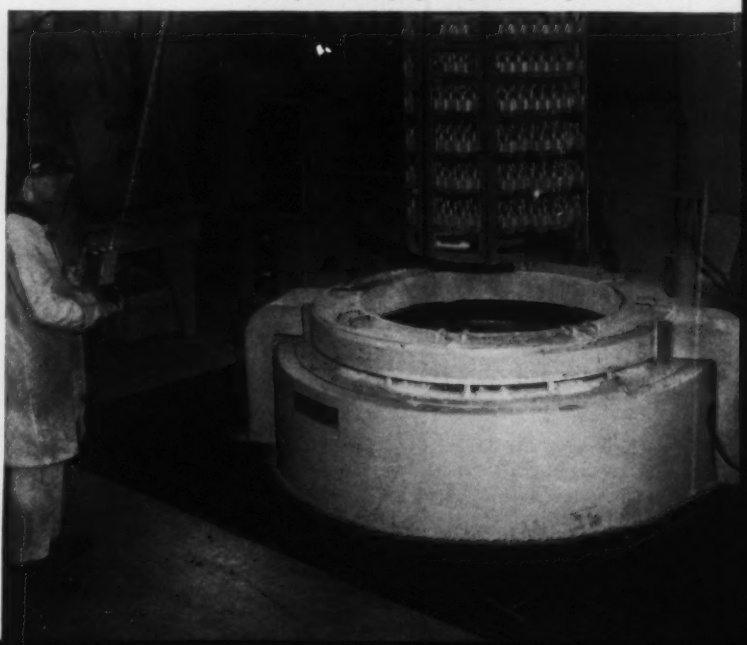
QUOTE

Mr. K. Falck-Pedersen, Chief Engineer, Commercial Shearing and Stamping Company, Youngstown, Ohio.

"The Lindberg heat-treating furnaces and atmosphere generating equipment installed in our Youngstown plant two and one-half years ago provided a fine solution to a big problem of ours. The units now give us complete and precise control over hardening and treating of gears for our high-pressure pumps. During these years, the equipment has proven trouble-free, required little maintenance and has proved to be remarkably easy to operate."

COMMERCIAL shearing & stamping

Gears being loaded in Lindberg Furnace at Commercial Shearing and Stamping Company, Youngstown, Ohio.



Lindberg equipment at Commercial is used for carburizing gears for high-pressure pumps and allows mass production of practically distortion-free gears, while holding the degree of hardness as well as depth of case to very close tolerances—load after load after load. The installation includes one electric and two gas-fired furnaces, Lindberg Hyen Atmosphere Generator and Carbotrol.

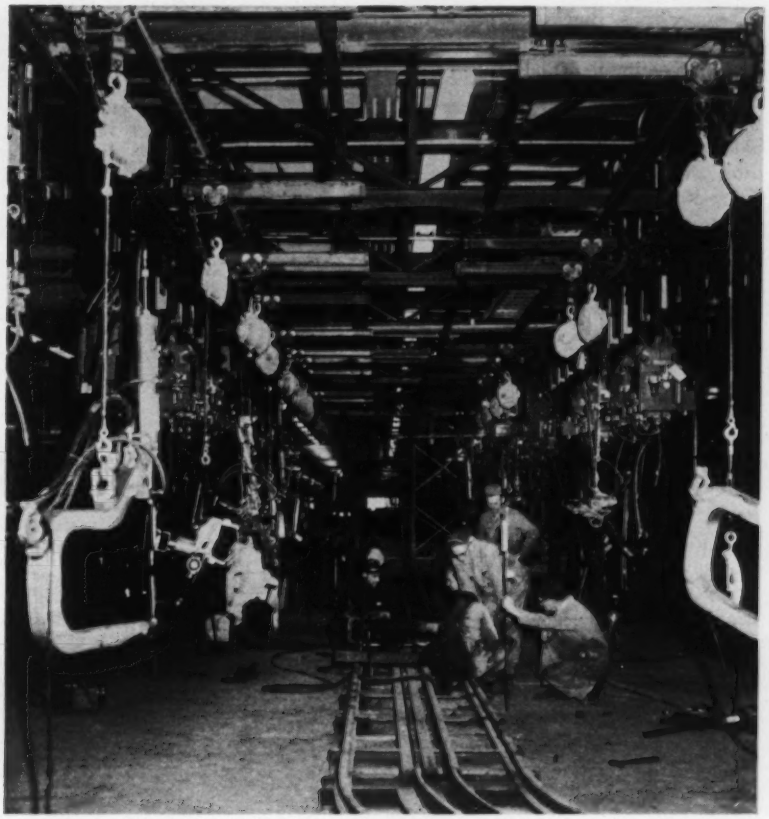
If you have a problem in heat treating, why not get the Lindberg representative's help now? You can depend on his experience and Lindberg's engineering and design know-how to provide exactly the right equipment for your need. And it's easy, too! Just call your Lindberg Field Engineer (he's listed in your classified phone book) or write us direct. Lindberg Engineering Company, 2441 West Hubbard Street, Chicago 12, Illinois.

Los Angeles plant: 11937 S. Regentview Avenue, Downey, California. In Canada: Birlefco-Lindberg Ltd., 15 Pelham Ave., Toronto 9, Ont. Also, Lindberg plants in Argentina, Australia, England, France, Italy, Japan, Spain, Switzerland and West Germany.

LINDBERG heat for industry

● Shifts in materials

● Redesigning of components



● More flexible equipment

Minor changes provide . . .

Tip-Offs to Future Car Programing

SEVERAL developments that will affect future automotive planning have cropped up in the last few months. Some have already been introduced. Investigation has started on others. You'll want to keep an eye on these to see how they may affect your business.

Materials

• One major materials firm has started surveying the possibilities of increasing the thickness of preplated nickel coatings on strip steel. If enough interest can be generated to boost thicknesses from 0.003 to 0.001 in., this company believes the strip will find considerable usage as an automotive trim material.

• Surfaglaze, Jones & Laughlin Steel Corp.'s precoated bumper steel, has been tested by Pontiac, Oldsmobile, and Ford. Although rival suppliers of bumper stock are dubious, J&L has enough orders to start quantity production next month. It's setting up a special processing line—Detroit auto company sources say the installation will cost $1 million. Avery C. Adams, J&L's chairman, says the material will be used for bumpers on three, 1962 cars.

The newly introduced material is precoated with phosphate and drawing compounds at the mill, so the customer won't have to flat polish (belt grind), clean, and coat it before forming. It can be taken directly to the stamping line when it arrives in cut lengths.

Costs are higher than those of regular bumper stock (base is $125.14 a ton, plus a precoating extra of $32, and another buck if the customer wants drawing compound). But J&L figures it will be worth the price because belt grinding removes as much as 2 per cent from regular material. Estimated loss: $3.30 per ton. Grinding also

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can put scratch lines on the surface, which affects final finishing while the presurfaced stock is processed in temper rolls. Biggest savings will be realized because the customer can eliminate equipment and labor costs of doing his own prefinishing.

Such a move may pose problems. One automotive firm that isn't enthusiastic about Surfaglaze, tells STEEL that it can't afford to scrap unamortized polishing equipment.

• Look for zinc usage to make a slight revival in the auto market in 1962. Grilles are a major target. Buick Special and some Rambler grilles are zinc diecastings instead of aluminum. The usage will be continued. Improvements in plating have put zinc back in competition with aluminum diecastings and stampings for items like grilles, headlamp bezels, and taillight housings. Zinc people claim their metal is showing up injection molded resins for instrument panel clusters because the material seriously deforms under high temperatures (over 200° F) which are built up by the sun beaming through windshields. But automakers still say 190° F is as hot as it ever gets in that area.

The American Zinc Institute reports average consumption of 85 lb of castings per car this year. Outlook is for 90 lb or better in 1962. That could mean 540 million lb of zinc going into Detroit products next year—excluding zinc coated galvanized.

• Ford's new corrosion test for exterior aluminum trim is the outgrowth of a development in body finishes. Lacquers now hold their luster so well that car buyers don't wash and polish cars as often as they did a few years ago. Result: trim parts don't get polished either, and the lack of protection has created more opportunities for electrolytic corrosion to set in as ferrous particles and water lodge in partially filled pores in the anodic coating.

The Ford test for anodized aluminum has been developed to measure the corrosion resistance of anodic coatings.

Components

• Alternators are closer to industry-wide use for passenger cars, thanks to developments in powder metallurgy that permit the application of low cost sintered rotors instead of stamped or machined parts. Another aid is the recent availability of inexpensive, cold rolled, low carbon, magnetic steels that can be $75 a ton less costly than the silicon electrical steels that have been used for motor laminations. These critically strained, cold rolled motor steels are being tested for alternators and for laminations in the small motors used to actuate power seats, windows, and windshield wipers.

U. S. Auto Output

Passenger Only

	1961	1960
January	415,857	688,690
February	364,385	659,298
March	407,959	654,241
April	446,739	582,869
May	542,303	611,260
5 Mo. Totals	2,117,243	3,196,358
June	.....	613,136
July	.....	434,377
August	.....	305,514
September	.....	407,691
October	.....	617,972
November	.....	597,638
December	.....	523,422
Total	.....	6,696,108
Week Ended	**1961**	**1960**
June 3	85,645	115,068
June 10	127,256	139,423
June 17	129,274	137,641
June 24	128,216	141,247
July 1	126,131†	125,868
July 8	75,000*	89,769

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

As things now stand, look for Ford and GM to start producing their own alternators for 1963 passenger cars. (Ford offers them on some trucks now.) Chrysler still is buying its alternators, which are 12.5 lb lighter than the generator units they replaced. International Harvester Co. also offers optional alternators for some trucks. The company says it's evaluating several makes, but it has no immediate plans to make them standard equipment. Motorola Inc. is one of the firms researching the possibility of producing alternators for auto use.

• Dual braking systems are supposed to be introduced in 1962 Cadillacs and perhaps on some Ramblers. The stopping systems are built around a pair of master brake cylinders. One is hooked up to the rear wheels only, the other to the front wheels. Added cost is outweighed by the additional safety factor, plus a new sales angle. Look for the dual braking systems to appear on other car lines in 1963. Lincoln and Thunderbird have been tabbed as likely bets at Ford.

Equipment

• Flexible production equipment that can be quickly changed over to produce a variety of parts or to process several types of parts on the same line is becoming a must with more than 360 different car models expected next year. One example: "Flexible automation" in Pontiac's engine line, which can machine both the regular V-8 powerplant and the "half V," 4 cylinder engine for the Tempest.

Ford is installing a battery of sliding bolster presses in its Dearborn, Mich., stamping plant so it can make quick die changes that will be needed to stamp out parts for a variety of models, and Cross Co., Detroit, has introduced trunnion machines that can handle a variety of operations on whole families of parts, like remote accessory cylinders for tractors.

• Floor pans and inner body panels are usually welded by placing them in a special body buck and dropping a multiple head welding fixture, called a waffle press. The upper and lower plates for these fixtures traditionally have been fabricated from steel weldments, which can weigh as much as 10,000 lb each. Because of the difficulty in handling the fixtures, the industry recently switched to aluminum plates for the fixture bases.

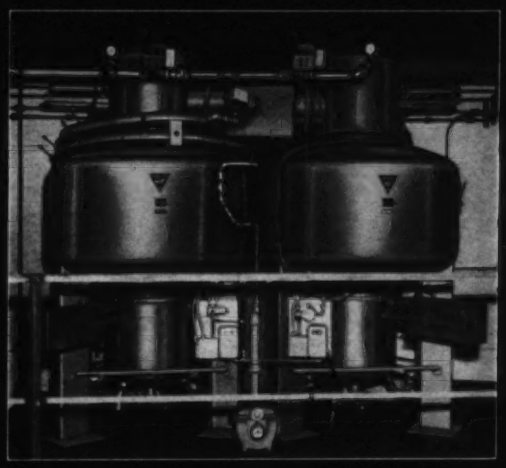
Now Centr-O-Cast & Engineering Co., Detroit, has beat costs on this technique by casting the huge upper and lower plates in aluminum. The rough castings are ribbed for strength and weigh 4400 lb as they come from the sand molds. Each one uses about 500 lb of brass chills. Finished, they weigh 3200 lb. The company has shipped ten to Goodrich Welding Equipment Corp., Hudsonville, Mich., for buildup.

They are 8 x 12 ft and 5¾ in. thick. The fixtures will go into five welding presses at Ford's Buffalo stamping plant. They'll be used to weld the rear floor pan assembly for the upcoming Canadian "X" and "Y" cars.

Announcing...

A "Meter Purchase Plan"
for the

VIC VAPOR RECOVERY SYSTEM

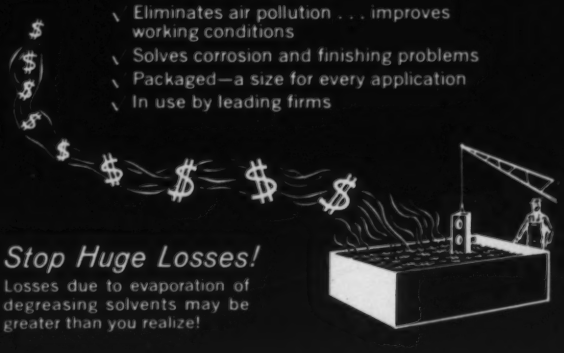


Installation at Superior Plating, Inc., Minneapolis, Minn., on overhead platform, takes minimum space.

Recover 50% or More of Losses Due to Evaporation with

THE VIC VAPOR RECOVERY SYSTEM

- Cuts Trichlorethylene costs
- Eliminates air pollution . . . improves working conditions
- Solves corrosion and finishing problems
- Packaged—a size for every application
- In use by leading firms



Stop Huge Losses!

Losses due to evaporation of degreasing solvents may be greater than you realize!

let the dollars it saves, pay for your Recovery System

Now—drastically reduce degreasing operation costs, eliminate air pollution *without* lump sum capital investment for vapor adsorber equipment! Install a Vic Vapor Recovery System; a meter measures volume of solvent recovered from evaporation. *Pay only a percentage of actual solvent recovered, calculated at your cost of new solvent.* On this basis, many firms realize sufficient savings to amortize the entire cost of the Recovery System the first year of operation! Better than a lease plan!

WHAT IS THE VIC VAPOR RECOVERY SYSTEM?

...A new, compact, *packaged* system for the recovery of reusable solvent from vapors normally exhausted outside or lost to the atmosphere in working areas. The Vic Vapor Recovery System has been thoroughly field tested on a number of actual installations. Users include such firms as Minneapolis-Honeywell Regulator Co., Micro Switch, Superior Plating, Inc., Colorado Fuel & Iron, Great Northern Railway, General Electric Co. and the Gray Co. The Vic Vapor Recovery System is endorsed by leading solvent manufacturers.

Rush coupon today . . . discover how you can recover ½ drum or more of degreasing solvent for every drum now used!

Protected by one or more of the following patents: Pat. No. 2,480,320; 2,772,747; 2,760,594; 2,910,137; Canadian Pat. No. 470,085 and other Patents applied for in U.S. and Foreign Countries.

VIC

If you care—you'll compare and buy

MANUFACTURING COMPANY
1313 Hawthorne Ave. • Minneapolis 3, Minn.

VIC **MANUFACTURING COMPANY**
1313 Hawthorne Ave.
Minneapolis 3, Minnesota

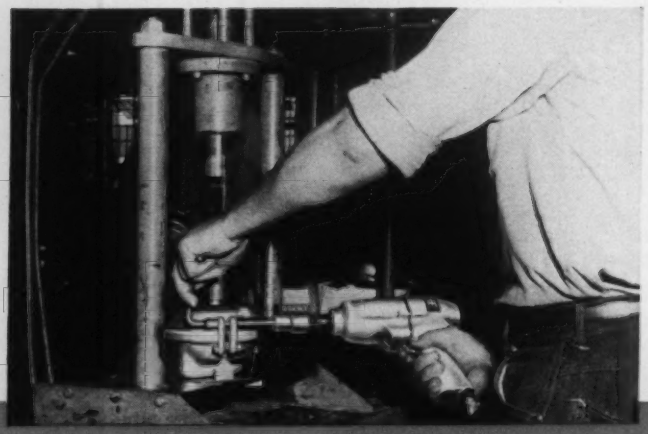
Please send complete details on the Vic Vapor Recovery System and Meter Purchase Plan.

Name_____

Company_____

Address_____

City_____ State_____



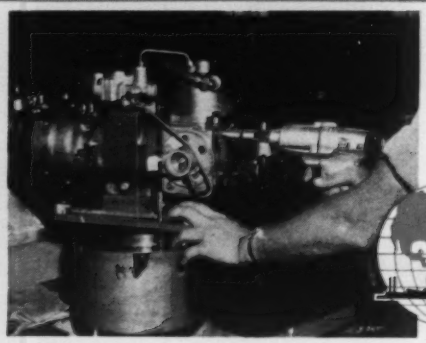
* Drawing up the band on air brake chamber to 25 ft. lbs. is a precise job performed over 1¼ million times by this Ingersoll-Rand automatic shut-off Torsion Bar Torque Control Impactool.

1¼ MILLION NUTS TO 25 FT. LBS.

...and still going STRONG!

One of four Ingersoll-Rand Torsion Bar Torque Control Impactools that quickly and accurately tighten four different size fasteners to 3 different torques in cylinder-tube assembly.

Ingersoll-Rand Impactool with Torsion Bar Torque Control set at 15 ft. lbs. runs Allen pipe plug to seal 100 lb. pressure in air brake chamber.



Automatic Torque Control improved performance almost 100% by providing exact torque in tricky assembly of oil reservoir to air compressor.

On the basis of this kind of performance, this brake manufacturer took advantage of the reliable quality control features possible with Ingersoll-Rand Torsion Bar Torque Control Impactools . . . and solved a "quality bottleneck" by using them on 11 different assembly operations. Rejects were almost entirely eliminated, inspection time and costs were cut to the bone and production increased by 34% to 45% per manhour.

In addition to dividends earned by improved product quality and greatly reduced reject and inspection costs, the increase in production per manhour means a Dividend on Payroll Dollars of from 34% to 45% of the tool operator's wages. The other operations shown here are setting similar quality and production records!

You can calculate your own dividend with the help of Ingersoll-Rand's new, illustrated guidebook, "How to earn a Dividend on Payroll Dollars with Planned Annual Retooling" . . . and handy Dividend Computer. Call your nearby I-R Representative or write Ingersoll-Rand, 11 Broadway, New York 4, N. Y.

Ingersoll-Rand

11 Broadway, New York 4, N.Y.

Planned Annual Retooling increases output per man

61A-8

Uptrends Dominate Business Data

CHART WATCHERS are having a ball. They haven't seen so many trend lines going up in many months.

Take the 12 leading indicators set forth by the National Bureau of Economic Research Inc. For the latest period, eight are going up, only four down. Or if you prefer, take the ten leading barometers followed by Prentice-Hall Inc. Seven are rising, three falling. Finally, 27 of the indicators which STEEL charts periodically are on the following two pages. At last count (mostly May data), 21 were above the prior month's level; 15 were still below; and one was unchanged.

• **Evidence Overwhelming** — There is, of course, a great deal of overlapping in those groups of statistics, but each is still sufficiently different to have its own value. Between them, they cover nearly all the business indicators which have significance for the national economy, and metalworking in particular, by reason of their timeliness (most are monthly) or their coverage. The only possible conclusion that can be drawn is that the economy is in the early stages of a vigorous, sound recovery which should carry well into 1962.

All the comparisons are made on a month to month (or quarterly) basis to indicate current direction. Some chart watchers prefer year-to-year comparisons, and they can come up with almost an opposite conclusion by doing so. For instance, on this basis, STEEL's 27 indicators show only 12 above comparable 1961 levels, while 25 are still below. But the pitfall here is that much of the economy in May, 1960, had not yet felt the recession that the steel and auto industries were clearly signaling. Thus many of the comparisons are made with record or near-record data for last year.

Such comparisons can change rapidly and give a misleading picture. The trend lines for 1960 (down) and 1961 (up) are about to cross in many cases. So a not-so-good picture of the indicators one month can turn—almost overnight—into an excellent one. In fact, the data for this year could remain unchanged (indicating a stagnant situation), but it might look good simply by virtue of last year's decline.

• **Scoreboard**—It is worth noting that often when the current direction of an indicator is down, it is of short duration. This indicates a special situation or simply proves the point that not all upturns (or downturns) are smooth.

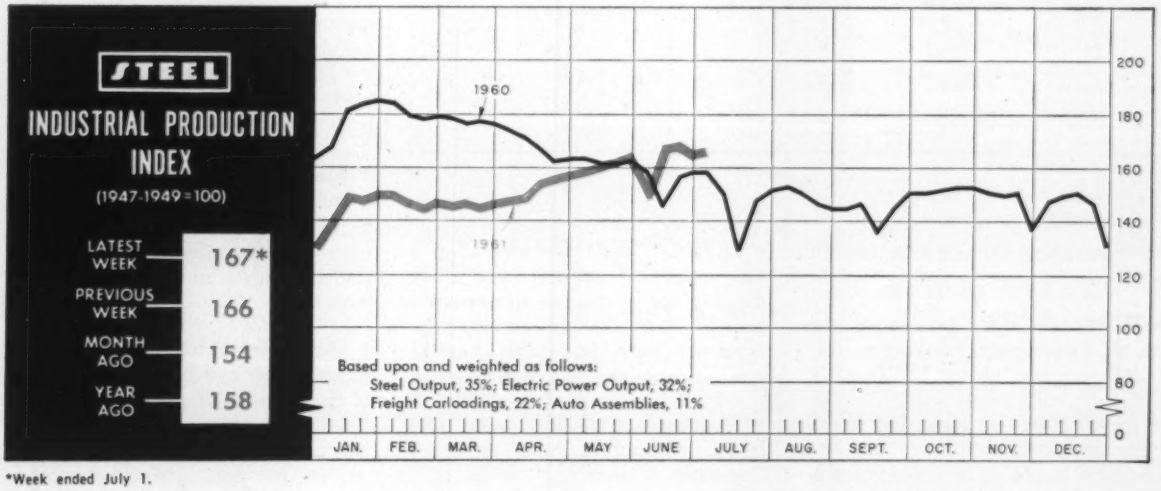
For instance, look at the NBER group:

• **Gross Accession Rate**—This indicator of labor turnover hit its low point last December. In January it rose, in February it dipped, rose again in March, and dipped in April (the latest month), but the general trend has been up.

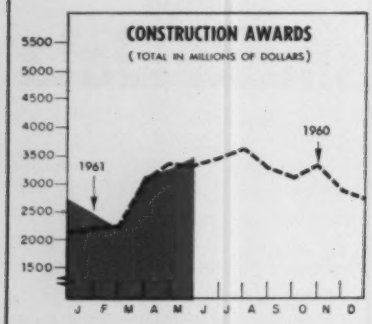
• **Corporate Profits**—Data currently available are for the first quarter, which was down. The feeling is that profits in the second quarter showed a rise.

• **Raw Materials Prices**—This trend line had been going up for five months until it hit a snag in June. Probable reason for the decline: Falling prices in the steel industry—a special situation to meet both foreign and domestic competition.

• **Inventories** — Considered one of the most volatile segments of the gross national product, manufacturers' inventories took a deep dip in the first quarter. However, it appears that manufacturers switched from a liquidation to an accumula-

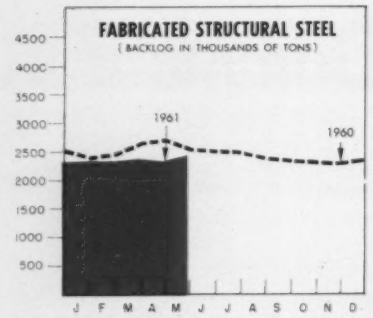


*Week ended July 1.



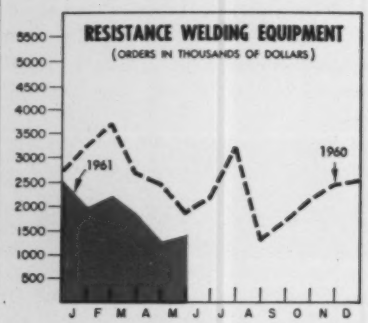
	Total		Building	
	1961	1960	1961	1960
Jan.	2,485	2,193	1,787	1,728
Feb.	2,235	2,240	1,674	1,685
Mar.	3,166	3,046	2,398	2,361
Apr.	3,297	3,360	2,504	2,527
May	3,501	3,337	2,658	2,563
June	....	3,472	....	2,593
July	....	3,597	....	2,481
Aug.	....	3,295	....	2,550
Sept.	....	3,119	....	2,402
Oct.	....	3,319	....	2,555
Nov.	....	2,886	....	2,169
Dec.	....	2,718	....	1,872
Totals	....	36,318*	....	27,345*

*Monthly figures do not add up to totals because of yearend revisions.
F. W. Dodge Corp.



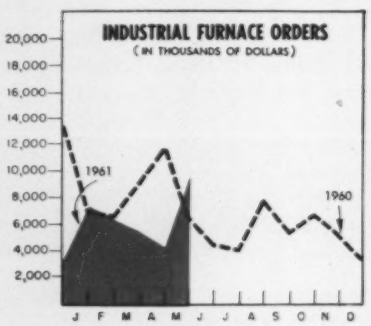
	Shipments		Backlogs	
	1961	1960	1961	1960
Jan.	261.6	235.1	2,371.2	2,390.5
Feb.	260.2	270.9	2,357.4	2,473.8
Mar.	292.4	311.6	2,392.1	2,671.8
Apr.	318.7	322.7	2,377.5	2,713.4
May	365.0	320.1	2,457.8	2,528.2
June	....	374.2	.....	2,507.5
July	....	338.9	.....	2,489.8
Aug.	....	373.4	.....	2,389.1
Sept.	....	363.9	.....	2,325.6
Oct.	....	352.8	.....	2,291.4
Nov.	....	324.7	.....	2,278.2
Dec.	....	276.9	.....	2,332.8
Total	....	3,865.2		

American Institute of Steel Construction.



	Net Orders		Shipments	
	1961	1960	1961	1960
Jan.	2,013	3,258	1,731	1,582
Feb.	2,236	3,732	1,916	2,563
Mar.	1,871	2,653	2,739	3,011
Apr.	1,322	2,446	2,613	2,943
May	1,464	1,871	2,318	2,310
June	....	2,205	....	3,267
July	....	3,244	....	2,221
Aug.	....	1,330	....	2,528
Sept.	....	1,689	....	2,559
Oct.	....	2,145	....	2,328
Nov.	....	2,457	....	1,927
Dec.	....	2,525	....	1,974
Totals	....	28,933	....	29,218

Resistance Welder Manufacturers' Assn.
Charts copyright, 1961, STEEL.



	1961	1960	1959
Jan.	7,291	6,827	4,545
Feb.	6,468	6,499	3,596
Mar.	5,535	9,033	7,842
Apr.	4,212	11,687	14,517
May	9,553	6,352	5,315
June	....	4,245	8,230
July	....	3,966	13,141
Aug.	....	7,840	9,738
Sept.	....	5,253	5,560
Oct.	....	6,634	12,867
Nov.	....	5,084	8,442
Dec.	....	3,248	13,437

Industrial Heating Equipment Assn. Inc.

tion position late in the second quarter.

• **Workweek**—This is one of the more encouraging barometers. It has been going up for five months.

• **Layoff Rate**—Another one of the labor turnover indicators, this one has been favorable for three months.

• **Durable Goods Orders**—This is the one that almost everybody watches for a clue to the nation's health. It has trended strongly upward for four consecutive months and is above the year-ago position.

• **Housing Starts**—This trend line is up one month, down the next. Currently, it is up.

• **Construction**—This is also an up-and-down barometer. But latest figures from F. W. Dodge Corp., indicate floor space of industrial and commercial construction contracts is edging up.

• **Business Community**—The size of the business community has been growing for so long that you have to look at the increment instead of direction to get the tip-off on business conditions. During the first quarter, the number of firms in operation grew by 10,000 compared with only 5000 in the previous quarter.

• **Failures**—At the same time, business failures have been increasing. However, commercial and industrial liabilities have been decreasing for the last two months of record.

• **Common Stock Prices**—Standard & Poor's Corp.'s common stock average has the longest unbroken uptrend of all the leading indicators—seven months. Only in June did the trend line show the slightest tendency to level out.

Prentice-Hall restricts its list of leading indicators to ten, which includes six of those listed above. The other four are:

• **New Hires**—Indicative of the increase in factory activity, this trend line has been edging up for two consecutive months.

• **Contract Awards**—P-H uses the *Engineering News-Record* series on contract awards for heavy construction. After starting out fast in the first quarter, it has been losing steam. The duration of the downtrend is two months as of May, and weekly reports suggest the string may go to three months with the final June report.

• **Machine Tools**—New orders for cutting type tools have been up and down so far this year. In the latest month, they were up slightly, but there has been no clear trend either way.

• **Gear Sales**—This is considered by many a sensitive barometer because of the wide use of gears in almost all types of hard goods. However, it has failed to show a positive trend so far this year. In the last two

months, the trend line has plummeted after reaching a near record level in March. The index reading of 193.7 (1947-49=100) in May was the lowest since December, 1959.

Among the 27 sets of statistics compiled by STEEL are several for the appliance industry, which has a tendency to give the over-all count a downward bias at this time of year. Of the nine products represented, only one—home washers—improved in the latest month of record. However, three—washers, electric ranges, and gas water heaters—were above the year-ago levels.

Buyers Feel Summer Slump

Purchasing agents declare that the "fair" second quarter hoped for in April is a reality. Respondents to the June survey of the National Association of Purchasing Agents noted some letdown at the end of the period, but remarked that they expected it as the natural result of vacation shutdowns, the normal summer slump, an early automotive model changeover, and the shipping strike.

Forty-three per cent reported new order improvement compared with 48 per cent in May, and those citing fewer orders rose from 11 to 14 per cent. Production statistics were almost identical.

Inventories of purchased materials continued downward despite better business. Sixty per cent reported no change, but decreases were reported by 28 per cent while only 12 per cent showed increases. "Close inventory control is still the order of the day," comments the Business Survey Committee. "However, remarks from members indicate that the substantial improvement in new orders and production in April and May drained raw materials more quickly than had been anticipated. This, when added to the wait-and-see attitude (brought on by price developments) has had the effect of lowering inventories without direct effort on the part of purchasing executives."

Gas Appliances: Going Up

Members of the Gas Appliance Manufacturers Association Inc., New York, predict sales in the last half of 1961 will be 1.2 per cent higher than those of the corresponding period of 1960, and 18.5 per cent above the first half of the year. Unit sales are traditionally greater in the last half of the year, says GAMA.

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)	1,800[1]	1,925	1,203
Electric Power Distributed (million kw-hr)	15,200[1]	14,870	14,643
Bituminous Coal Output (1000 tons)	8,965[1]	8,875	9,022
Crude Oil Production (daily avg—1000 bbl)	7,050[1]	7,097	6,811
Construction Volume (*ENR*—millions)	$456.7	$469.6	$686.4
Auto, Truck Output—U. S., Canada (*Ward's*)	161,072[1]	160,867	155,574
TRADE			
Freight Carloadings (1000 cars)	600[1]	600	549
Intercity Truck Tonnage (changes from year ago)	+1.2%	+1.2%	−6.6%
Business Failures (Dun & Bradstreet)	307	351	296
Currency in Circulation (millions)[2]	$32,202	$32,247	$31,867
Dept. Store Sales (changes from year ago)[2]	+2%	+8%	+3%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$29,384	$33,261	$27,064
Federal Gross Debt (billions)	$288.4	$291.1	$286.1
Bond Volume, NYSE (millions)	$25 4	$25.2	$24.5
Stocks Sales, NYSE (thousands of shares)	13,554	16,077	14,820
Loans & Investments (billions, adjusted)[3]	$114.2	$113.8	$103.8
U. S. Govt. Obligations Held (billions)[3]	$32.9	$33.1	$25.6
PRICES			
STEEL's Finished Steel Price Index[4]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[5]	225.5	226 5	221.3
All Commodities[6]	118.7	118.7	119.4
Commodities Other than Farm & Foods[6]	127.8	127.7	128.2

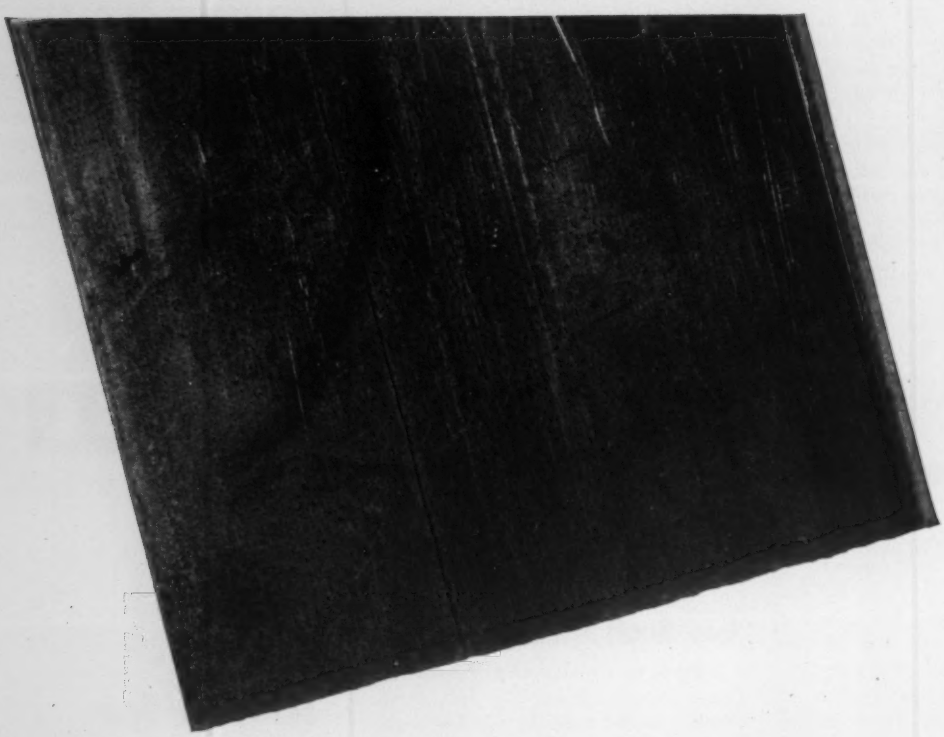
*Dates on request. [1]Preliminary. [2]Federal Reserve Board. [3]Member Banks, Federal Reserve System. [4]1935-39=100. [5]1936-39=100. [6]Bureau of Labor Statistics Index, 1947-49=100.

Coming July 17 IN STEEL

Invent for Profit Growth

Check STEEL next week for a story on how to organize for inventions that will keep your profits growing.

This will be the fourteenth installment in a 25-part series that will run for the rest of the year. For a free copy of any or all articles in the program (appearing biweekly since Jan. 16), write: Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.



the proof is in the cutting

The first cutting stroke of your Nicholson or Black Diamond industrial blade will tell you. Whether you're using a hand hacksaw, power hacksaw or band saw blade, you'll know you're using the finest that modern technology can make.

Each Nicholson or Black Diamond blade gives you a superb edge of precision-made teeth... each blade is made from the finest metal... each blade will give you clean, fast cutting and maximum shop life.

Here's the way to save time and to save replacement costs. Whatever your cutting requirements are, ask your distributor* for a supply of appropriate Nicholson or Black Diamond blades. The proof of blade superiority is in the cutting. He's also ready to suggest the best blade types for your purposes.

* Industrial Distributors provide the finest goods and services in the least possible time. Our products are sold exclusively through them.

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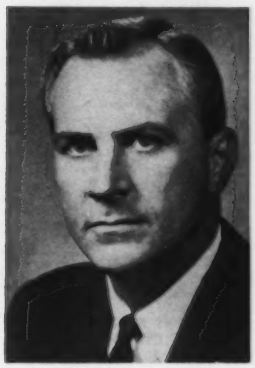
NICHOLSON

KENNETH M. LORD
Raytheon vice president

JOHN H. EIKENBERG
Revere Copper president

JENNINGS R. LAMBETH
heads steel service center div.



JOHN W. WEST
Crosby-Laughlin sales

Kenneth M. Lord was elected vice president-manufacturing and purchasing for **Raytheon Co.**, Waltham, Mass. He resigned as vice president and general manager, Military Products Div., at General Dynamics Corp.'s Electronics Div. **E. Nevin Kather** was made general manager, Semiconductor Div.; **John T. Thompson** general manager, Distributor Products Div.

John H. Eikenberg was elected president, **Revere Copper Brass Inc.**, New York, to succeed **Charles A. MacFie**, retired. He was a vice president.

William S. Ginn was named president, **Baldwin - Lima - Hamilton Corp.**, Philadelphia, to succeed **McClure Kelley**, who became chairman and continues as chief executive officer. Mr. Ginn was vice president and general manager of General Electric Co.'s Turbine Div.

W. K. Morga was made manager of manufacturing for **Mallory Metallurgical Co.**, Indianapolis, division of P. R. Mallory & Co. Inc.

Hanson - Whitney Co., Hartford, Conn., appointed **Augustus Vogel** vice president and director of sales.

George Mickas was named manager, Research & Development Dept., **Michigan Tool Co.**, Detroit.

Charles W. Parker Jr. was named to the new post of general marketing manager, New Products Dept., **Allis-Chalmers Mfg. Co.**, Milwaukee.

Jennings R. Lambeth joined **Youngstown Sheet & Tube Co.**, Youngstown, as manager of its new Steel Service Center Sales Div. He was vice president-sales of Jones & Laughlin Steel Corp.'s Warehouse Div. in Indianapolis.

Robert W. Lear was made vice president-marketing, **Carborundum Co.**, Niagara Falls, N. Y. He was director of marketing services at American Radiator & Standard Sanitary Corp.

E. R. Bellows was made manager of Eastern castings sales, Foundry & Mill Machinery Group, **Blaw-Knox Co.**, Pittsburgh. He succeeds **B. P. Hammond**, retired.

Hupp Corp. elected three executives to positions in its **Gemco Inc.** subsidiary in Los Angeles. **Fred W. Hottenroth** was elected president; **Jack J. Lane** vice president-marketing; and **Jerome Belsky** vice president-manufacturing and engineering.

John W. West was made general sales manager, **Crosby - Laughlin Div.**, Ft. Wayne, Ind., American Hoist & Derrick Co. He replaces **Percy Gough**, recently made director of marketing of American Hoist, its divisions and subsidiaries.

Edward W. Ervasti, former assistant director-marketing, was made director of marketing, **Wolverine Tube Div.**, Allen Park, Mich., Calumet & Hecla Inc.

J. Carl Nivus joined **Vickers Inc.**, division of Sperry Rand Corp., in charge of purchasing at the Omaha, Nebr., plant. He was head of purchasing at Brainard Steel Div., Sharon Steel Corp. **John A. Wotring** was made general service manager, Aero Hydraulics Div., with headquarters at Vickers' Detroit facility. He was in charge of systems engineering at the Torrance, Calif., plant.

Nick G. Lirones was made development project engineer at **Misco**

FRED W. HOTTENROTH

JACK J. LANE

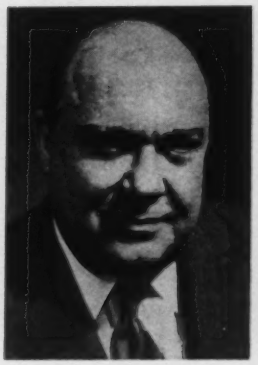
JEROME BELSKY

Gemco Inc. executive positions

PAT MINERVINI

BERNARD PLEVYAK

Daystrom-Military Electronics posts



R. M. VILSACK

F. C. KUCKUCK

Taylor Forge & Pipe Works appointments

Precision Casting Co., Whitehall, Mich., division of Howe Sound Co.

Daystrom Inc.'s Military Electronics Div. at Archbald, Pa., named **Pat Minervini** engineering manager to succeed **Edgar G. Grant**, recently named to the new post of director of new product planning. **Bernard Plevyak** was named chief product engineer to succeed Mr. Minervini.

Lawrence M. Krebs was made manager of the Michigan district for **Denison Engineering Div.**, American Brake Shoe Co. He has headquarters in Troy, Mich.

Benjamin F. Rose Jr., manager of **Aerojet-General Corp.'s** Aetron Div. at Covina, Calif., was elected a vice president of the corporation.

Edward M. Carty was named purchasing agent, **Bartlett-Snow Div.**, Cleveland, Bartlett - Snow - Pacific Inc. He was buyer for C. O. Bartlett & Snow Co., merged into the new company.

Taylor Forge & Pipe Works, Chicago, appointed **R. M. Vilsack** manager of field sales, Flanges & Fittings Div. He was regional sales manager, Eastern Div., New York, and is replaced by **J. A. Lynch Jr.** **F. C. Kuckuck**, former assistant general sales manager, was promoted to assistant to the vice president-sales. He will also serve as acting general sales manager, Aircraft & Custom Forging Div. **A. J. Del Buono** was made general manager-sales engineering.

John B. Ulam was named president, **Composite Metal Products Inc.**, Washington, Pa.

George Low was made manager of the Detroit plant of **McLouth Steel Corp.** He is succeeded as general superintendent by **James Ambrose.** **Paul E. Lindberg Jr.** was made assistant manager of the Trenton, N. J., plant and **Jack Horsley** succeeds him as superintendent of the Hot Metal Div. **Paul Zimmerman** was made superintendent-oxygen process, and **Thomas Sigler** assistant superintendent-oxygen process, Trenton plant; **Edward Navoy** assistant general superintendent, and **Joseph Bavol** cold mill superintendent, Detroit plant.

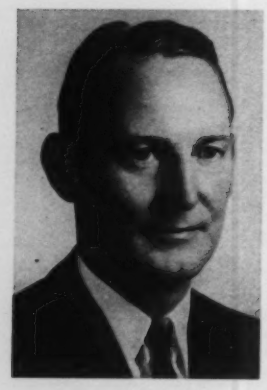
Elmer Burt was made assistant sales manager, **Reed Rolled Thread Die Co.**, Holden, Mass., subsidiary of Union Twist Drill Co.

Don T. McKone Jr. was made executive vice president in charge of domestic manufacturing and sales at **Aeroquip Corp.**, Jackson, Mich.

Wilford E. Metzger Jr. was made assistant sales manager, Hydraulic Machinery Div., **Birdsboro Corp.**, Reading, Pa.

Paul W. Beamer was made sales manager, Eastern Div., **Wyman-Gordon Co.**, Worcester, Mass. He continues as director of product and sales development.

C. W. Boyle was made general sales manager, **Plasteel Products Corp.**, Washington, Pa. He suc-



GEORGE LOW

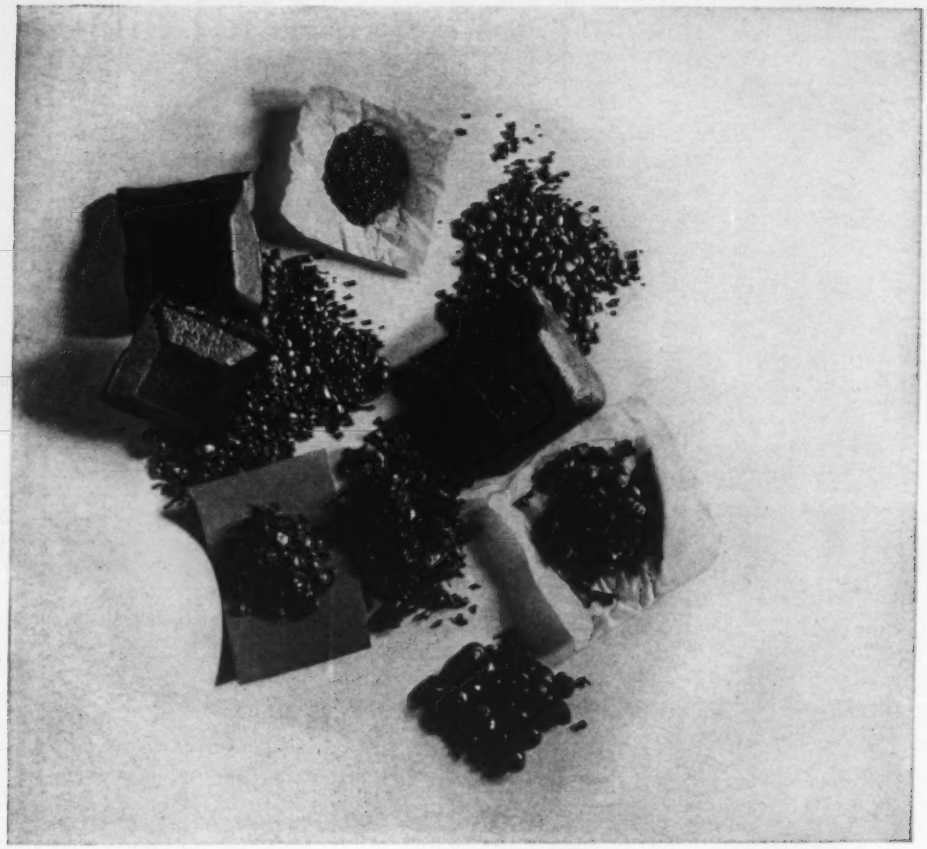
JAMES AMBROSE

PAUL E. LINDBERG JR.

JACK HORSLEY

McLouth Steel appointments at Trenton and Detroit

ASARCO ALLOY ADDITIVES



Improved alloys at less cost with "ready to add" master alloys

Asarco alloying materials, produced under strict metallurgical controls, reduce alloying costs, improve casting performance, and contribute substantial savings in subsequent production costs.

BISMUTH is used to improve the dispersion of graphite in malleable iron castings. Available in shot, pellet and ingot forms.

SELENIUM improves machinability of stainless steel, controls its porosity. Asarco master alloys include ferro-selenium and nickel-selenium containing 50-60% selenium, and selenium powder.

TELLURIUM is used for degasifying, to minimize porosity, and improve machinability of stainless steel. It is also used for producing hard chilled iron castings. Ferro-tellurium containing 50-58% tellurium is available in chunk form. Tellurium is also available in powder, stick, slab and tablet forms.

Federated Metals Division produces and sells:

PELLET LEAD, readily assimilated into molten steel, dissolves into finely dispersed particles which lubricate and result in faster, smoother machining, longer tool life.

PHOSPHOR COPPER used as a deoxidizer, in shot or waffle form, improves castability, assures sharper detail, reduces porosity.

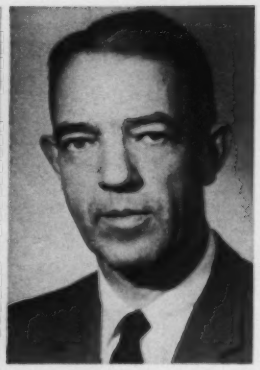
OTHER ALLOY ADDITIVES produced by Federated are: Aluminum, Arsenical Copper, Chromium Copper, Copper-Nickel Shot, Manganese Copper, Silicon Copper, Titanium Aluminum, Copper Magnesium, Copper Shot, Cadmium Copper, Copper Iron, Aluminum Copper.

For complete information, write on your company letterhead to: Federated Metals Division, American Smelting and Refining Company, 120 Broadway, New York 5, New York.

ASARCO

WALTER A. BAUMSTARK
Carpenter Alloy Tube sales

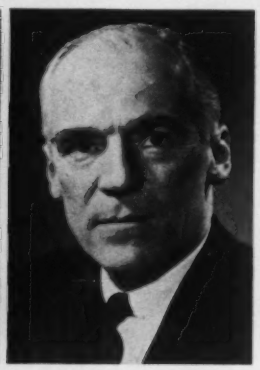
FRANCIS S. NAPOLI
Towne Robinson Nut post



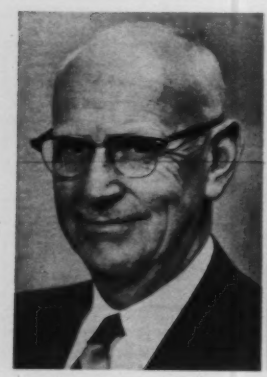
THOMAS A. CLAIBORNE
TC&P div. sales

JAMES GORE III
Pittsburgh Chemical div. mgr.

RAYMOND R. KONDRAT
Metals & Controls post



WILLIAM G. MILLER
Alco exec. v. p.



ARTHUR S. JOHNSON
Achorn Steel v. p.

WILLIAM I. TRADER
Peninsular Steel pres.

THOMAS F. FLEMMING
CF&I plant mgr.

ceeds **Samuel D. Saul**, recently elected executive vice president.

Arthur S. Johnson was elected vice president of **Achorn Steel Co.**, Cambridge, Mass. Also elected a vice president was **Edward H. Johnson. Fred C. Kenney Jr.** was elected manager of tool steel sales; and **Donald H. Achorn** assistant to the president and general manager.

Thomas F. Flemming was made acting plant manager of **Colorado Fuel & Iron Corp.'s** Brooke plant in Birdsboro, Pa. **Robert W. Freeman** was made wire metallurgist in CF&I's Buffalo plant wire mill.

William I. Trader was elected president of **Peninsular Steel Co.**, Detroit. He was executive vice president.

Walter A. Baumstark was made sales manager, Alloy Tube Div., Union, N. J., **Carpenter Steel Co.** He is succeeded as Midwestern regional sales manager, Chicago, by **Harry L. Harner.**

Francis S. Napoli was made plant manager of **Towne Robinson Nut Co.**, Dearborn, Mich. He will direct the firm's new expansion program into the electronic, aircraft, and missile fields.

Thomas A. Claiborne was made general sales manager, Alloy & Metals Div., Nashville, Tenn., **Tennessee Products & Chemical Corp.**, subsidiary of Merritt-Chapman & Scott Corp. He was Southwest regional sales manager at Houston for both Tennessee Products and its subsidiary, Tenn-Tex Alloy & Chemical Corp.

James Gore III was made manager-administration, production, and tar sales for the Protective Coatings Div. of **Pittsburgh Chemical Co.**, Pittsburgh. He was production and planning co-ordinator for the division.

Raymond R. Kondrat was made manager of industrial products for the Nuclear Products Group of **Metals & Controls Inc.**, Attleboro, Mass., division of Texas Instruments Inc.

William G. Miller was elected executive vice president, **Alco Products Inc.**, New York. Since 1960, he has been vice president in charge of the company's thermal and petroleum industry equipment groups. He previously was president of the Canadian affiliate, Montreal Locomotive Works Ltd.

John B. McBride was made St. Louis district sales manager, **Republic Steel Corp.** He succeeds the late **William F. Schupp.**

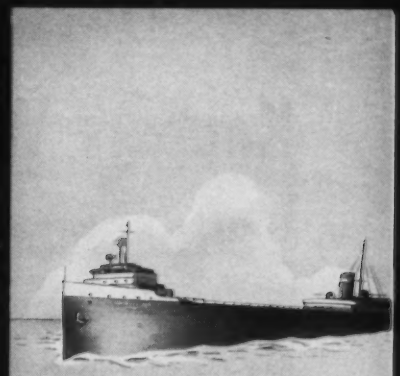
OBITUARIES...

Arthur E. Maginn, 66, purchasing agent, **Lord Mfg. Co.**, Erie, Pa., died July 1.

William E. Sloan, 94, chairman and founder, **Sloan Valve Co.**, Chicago, died June 25.

Forged Steel Shafting Adds New Life to Great Lakes Carrier

11 tons of forged steel machined to less than .002" tolerance



Machining holes for connection between thrust and crankshafts.

Photos courtesy
Fraser-Nelson Shipbuilding and Dry Dock Co., Inc.
Superior, Wisconsin

Connecting the forged steel thrust shaft and 3-throw crankshaft at Fraser-Nelson Shipbuilding and Dry Dock Company, Inc., Superior, Wisconsin.

This 11-ton 30-foot forged steel shaft assembly readies the Midland Steamship Lines carrier, Michael K. Tewksbury, to do battle against the buffeting waves of the Great Lakes. The one-piece crankshaft was twisted and machined to less than .002" tolerance along with the thrust shaft at Erie Forge & Steel Corporation. These components replace the drive system powered by an 1800 hp. triple-expansion steam engine . . . new service life for this veteran Great Lakes ore and grain carrier.

Here, at Erie Forge & Steel Corporation, continuous quality control procedures direct the work of skilled craftsmen from order to shipping dock.

Your requirements for quality forged and cast steel components are a challenge which we welcome — consult with us in full confidence that we will serve you well.

ERIE FORGE & STEEL CORPORATION

ERIE, PENNSYLVANIA

Koppers Will Supervise Venezuelan Steel Plant

KOPPERS CO. INC., Pittsburgh, has signed a long term, management advisory contract with Corporacion Venezolana de Guayana involving an integrated steel plant being built at Matanza, Venezuela (STEEL, July 29, 1957, p. 81). Initial stages will be put into operation this year. The facility will provide Venezuela with urgently needed steel products, including seamless pipe for oil drilling.

The agreement provides for starting up the various units as rapidly as possible. Koppers personnel will act as advisers on construction and continued operation of the facility.

The plant site is close to iron ore mining operations being carried out by Bethlehem Steel Co. (at El Pao) and by U. S. Steel Corp. (at Cerro Bolivar). The plant has been under construction since March, 1957—Innocenti S.G., Milan, Italy, is doing the work. The seamless tube mill and the wire drawing plant are scheduled to be in operation during the next few months. (It'll use imported semifinished steel.) Other units will be completed during the next two years.

Finished products will include reinforcing bars, structurals, rails, wire, cast iron pipe, and seamless tubing.

Nine electric smelting furnaces are used in the plant to reduce iron ore to pig iron. Each furnace has a daily capacity of 220 to 242 net tons of pig iron. The pig iron will be refined to steel in four, 275 ton, open hearth furnaces. The annual ingot capacity of the plant will be about 825,000 tons.

Robert T. Eakin is the Koppers' general representative for the management contract. P. V. Martin is vice president of Koppers Engineering & Construction Div. and president of Koppers de Venezuela C.A.

Venezuelan Firm Formed

Kaiser Aluminum & Chemical Corp., Oakland, Calif., and a group of investors in Venezuela have organized a company, Aluminio Nacional S.A. to establish aluminum foil production facilities in Venezuela. A plant at Guacara will begin operations late this year. Kaiser will hold a 26 per cent interest and will supply aluminum sheets and technical assistance.

Davis Improves Facilities

Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., has enlarged and improved the heat treating facilities at its Davis Div. New facilities include a 9 cu ft nitriding furnace.

The facilities "improve product quality, reduce delivery time as much as three weeks, and enable Davis to case harden any tool, regardless of its configuration," says W. M. Ritter, sales and engineering manager of the division.

Plans Aluminum Complex

Alcoa of Australia Proprietary Ltd. has been organized to establish and operate a $100 million, integrated aluminum complex in Australia. The new concern plans to begin construction by the end of this year and to commence operations within two years. Aluminum Co. of America, Pittsburgh, will own 51 per cent of the company; a group of Australian mining companies, the balance. The project will include bauxite mining facilities and a refining plant near Perth; a smelter with an annual capacity of 40,000 long tons, a fabricating plant, and a powerplant at Geelong.

Research Center Dedicated

A $1.3 million research center in Southfield (Detroit), Mich., has been dedicated by Eaton Mfg. Co., Cleveland. Housed in the center is another $1 million worth of mechanical, metallurgical, chemical, and electrical equipment for use in the company's expanded research and development program. Emphasis will be placed on development of new products. The center will also engage in improving and refining present products in the automotive, truck, industrial, and marine fields. Sidney Oldberg is director; Robert Brown associate director. The Eaton Technical Center, which is devoted to the development of process equipment and new products, is in South Euclid, Ohio.

Anodizing Facility Opened

A new anodizing facility, representing a major change in commercial magnesium anode coating, has been put in full operation by Magnode Products Co., Trenton, Ohio. Designed to coat magnesium water heater anodes, the facility utilizes the patented HAE process—licensed from Western Sealant & Metal Finishing Co., Philadelphia.

Firms Change Designations

Koehring Co., Milwaukee, changed the name of its division, Hydraulic Press Mfg. Co., Mt. Gilead, Ohio, to H-P-M Div. The division makes plastic molding, diecasting, and metalworking machines.

Boeing Airplane Co., Seattle, changed its name to Boeing Co. The company has extended its activities from aircraft to missile, spacecraft, electronic, electromechanical and allied fields.

E. C. Smith Mfg. Co., Conshohocken, Pa., changed its name to Smith Thermotronics Inc. The firm makes thermocouple temperature measuring elements and accessories.

Ups Coal Chemical Output

A new tar distillation plant is in operation at the Clairton (Pa.) Works of U. S. Steel Corp. The plant replaces former facilities and will enable the company to increase production of coal chemicals. The tar processed comes from gas that is driven off when coal is heated in coke ovens.

Beta Gauge Div. Formed

Ohmart Corp., Cincinnati, has formed a Beta Gauge Div. to specialize in the application of nuclear beta measuring gages and systems. Snowdon Rowe has been named product manager of the division.

Linde to Provide Oxygen For Sheet & Tube Plant

Linde Co., a division of Union Carbide Corp., New York, will build a 280 ton gaseous oxygen plant at Youngstown, to supply oxygen to Youngstown Sheet & Tube Co.'s Campbell Works. The new facility will enable Sheet & Tube to double the output of several steelmaking open hearths now being converted to the oxygen process. Cost: $3 million.

Wheel Plants Re-equipped

American Brake Shoe Co., New York, is converting its cast iron wheel plant at St. Louis to the manufacture of cast steel wheels. (They're for freight cars.) New electric furnaces, heat treating, and machining facilities are being added. Cost: $2 million.

The company is also spending $1 million to expand its cast steel wheel plant at Calera, Ala. Eventually, it may convert its cast iron wheel plants at Portsmouth, Va., and Toledo, Ohio.

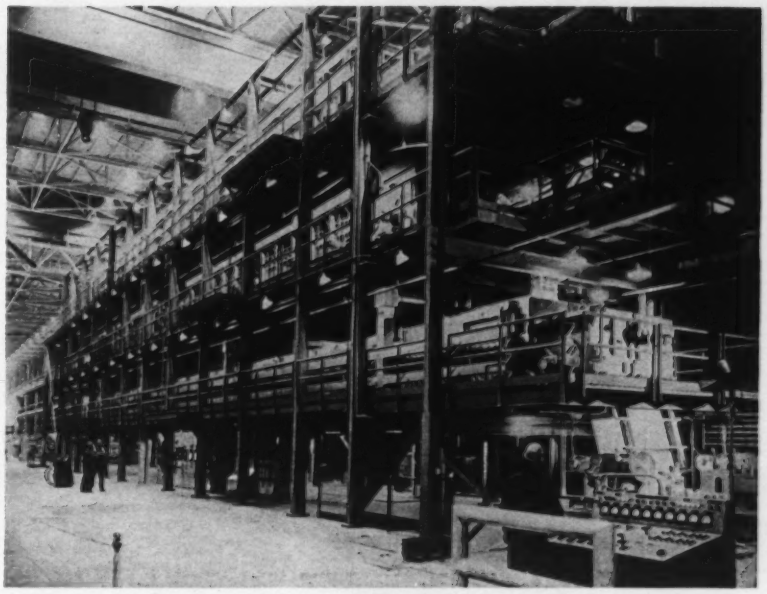
Holland Enlarges Plant

Holland Mfg. Co., Baltimore, opened a 20,000 sq ft plant addition. The firm makes packaged hardware items, including tacks, nails, staples, screws, and bolts.

CONSOLIDATIONS

Ferry Cap & Set Screw Co., Cleveland, acquired **Baldwin Mfg. Co.**, Toledo, Ohio, and will operate it as a division. Baldwin specializes in the design and manufacture of precision sheet metal parts and assemblies for the electric, electronic, and aircraft industries.

American-Marietta Co., Chicago, and **Martin Co.**, Baltimore, will merge, subject to approval of stockholders. Officers of the consolidated firm would include: Chairman and president, G. M. Bunker; vice chairman, G. M. Hermann.



Furnace Bricked, Shipped in Sections

FACTORY bricking and shipment in sections made for more convenient installation of a 175 ft long galvanizing furnace at Midwest Steel Corp., Portage, Ind., subsidiary of National Steel Corp. The furnace was supplied by the Industrial Heating Dept., Shelbyville, Ind., of General Electric Co.

Pittsburgh Standard Conduit Co., Verona, Pa., purchased the principal assets of **Wagner Products Co.**, Decatur, Ill., and will operate the property as its Wagner Fittings Div. Franklin McDermott is vice president in charge of the division with headquarters in Chicago.

Standard Steel Specialty Co., Beaver Falls, Pa., acquired **Duer Spring & Mfg. Co.**, McKees Rocks, Pa., and will operate it as a division. Duer makes precision mechanical springs.

NEW PLANTS

Permaco Metal Fabricating Co. has built a 20,000 sq ft plant at Lowellville, Ohio. Cost: $500,000. The plant will turn out metal closures, shelters, steel curbing, islands for auto service stations and parking lots, and guard rails for highways.

Miller Steel & Aluminum Div., Robert Campbell Co., is building a 61,000 sq ft service center in Linden, N. J., which will triple present operating capacity at Hillside, N. J.

ASSOCIATIONS

American Society for Testing & Materials (formerly American Society for Testing Materials), Philadelphia, elected these officers: President, M. N. Clair, Thompson & Lichtner Co. Inc., Brookline, Mass.; vice president, A. C. Webber, E. I. du Pont de Nemours & Co. Inc., Wilmington, Del.; and senior vice president, R. Wade Seniff, Baltimore & Ohio Railroad, Baltimore.

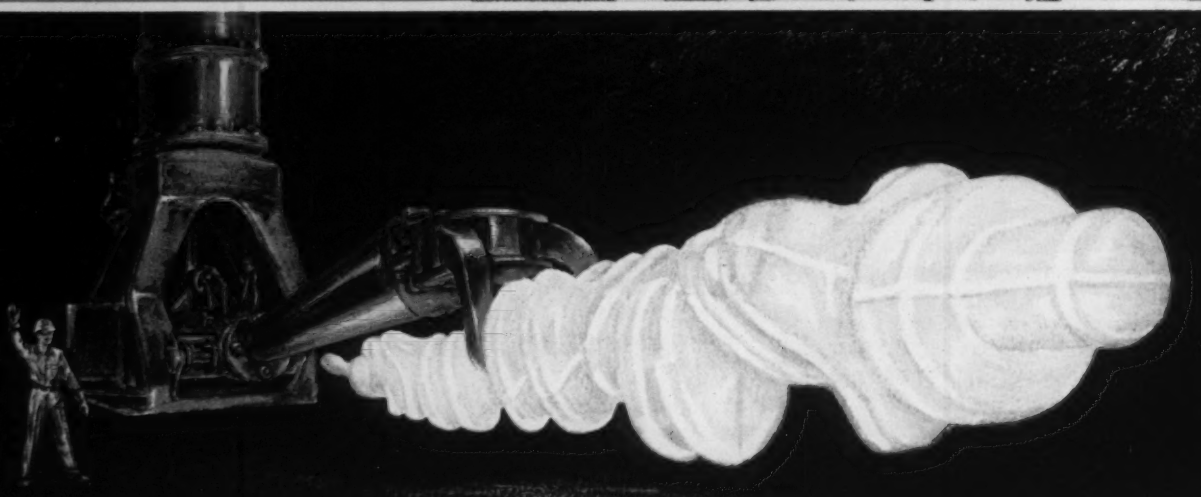
Austin E. McDonough, superintendent of blast furnaces at South Works, South Chicago, Ill., U. S. Steel Corp., has been elected president of the **Western States Blast Furnace & Coke Plant Association.** Other officers include: Vice president, H. S. Wilson, assistant division superintendent of the coke plant, Gary Steel Works & Furnaces, Gary, Ind., U. S. Steel Corp.; and secretary - treasurer, W. O. Bishop, superintendent, plant No. 2 blast furnaces, Indiana Harbor Works, East Chicago, Ind., Inland Steel Co.

NO MATTER IF DESIGNS WEIGH

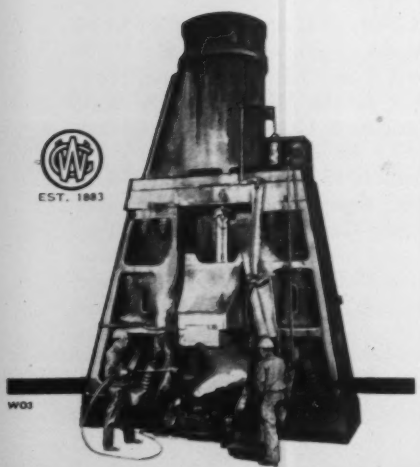
OUNCES

OR

TONS



. . . you always have the right supplier for any size forgings when you have Wyman-Gordon in mind



EST. 1883

W03

Little reason exists these days for permitting usual "design ceilings" on closed-die forgings—whether in weight, size or configuration—to handicap a product development program. For chances are Wyman-Gordon can lift such limitations entirely from any part planned, or now on your boards.

Your call will bring a seasoned forging specialist who talks forging language—in specific terms of design objectives—and has at his finger tips to help solve your problems the wealth of technical application and product-engineering data amassed by the country's foremost forging organization. Even more, he brings to your design team the latest developments in forging techniques and metallurgical breakthroughs that are substantially extending forging applications in every design dimension.

When you choose Wyman-Gordon you also benefit from the leader's experience in giving your parts optimum metal soundness and physical properties. While these are admittedly generalizations, they have been proven repeatedly in the products of hundreds of top-ranking industrial concerns we serve in every field. Our design assistance—on forgings weighing ounces or tons, produced from any forgeable metal or alloy—can prove as profitable for you as for them.

WYMAN-GORDON

FORGINGS

of Aluminum Magnesium Steel Titanium . . . and Beryllium Molybdenum Columbium and other uncommon materials

HARVEY ILLINOIS — WORCESTER MASSACHUSETTS — DETROIT MICHIGAN

GRAFTON MASSACHUSETTS — LOS ANGELES CALIFORNIA — PALO ALTO CALIFORNIA — FORT WORTH TEXAS

Technical Outlook

COMPACT RUMOR—Detroit dopesters have it that a Midwest producer of small, special service vehicles will bring out a 60 hp sports runabout sometime next year. Features include: Four seats, 95 in. wheelbase, a Continental, stationary, air cooled engine. Cost: Less than $2000.

SUPERCONDUCTOR ALLOY— A new superconductor wire is made of an alloy of columbium (three parts) and zirconium (one part). At minus 452° F, the wire has conducted 100,000 amperes of electricity per square centimeter in a magnetic field of 30,000 gauss. That's like saying you can safely plug 100 toasters in a kitchen size outlet.

ZINC PROTECTS COLUMBIUM — Protective action of a zinc base coating on columbium is due to a tight layer of zinc oxide at high temperatures, states B. F. Brown, Naval Research Laboratory. You can obtain details in a progress report (PB 161,932) by sending $1 to Department of Commerce, Washington 25, D. C.

WHISKERS AND SHORTS— Normal checkout procedures proved futile when Boeing Co. engineers tried to find the cause of short circuits that developed in work on the Dyna-Soar. Reason: Molybdenum trioxide formed in "hot spots," penetrated insulation, becoming exceedingly conductive above 1500° F. Below 500° F, the trioxide became whiskers that acted as an insulator. Boeing's solution: A thin metal shield over the wiring affected.

NODULAR IRON ENGINES—New techniques substantially reduce weight of precision molded engine blocks, announces C. H. Patterson, vice president, Ford Motor Co., Detroit. Keys to development of a lighter engine are: A new plastic resin binder which increases accuracy; preheated coreboxes that cure the shapes in seconds, reducing or eliminating handling distortion; high pressure cylinders for molding machines which improve density and uniformity. Detroit informants say two automakers are working on nodular iron engine blocks for 1963 models. Ford could introduce one earlier—perhaps in 1962.

MORE ALUMINUM— Makers of light planes are switching to aluminum engine mounts to replace the traditional welded steel tubing, reports Cessna Aircraft Co., Wichita, Kans. Another shift: Plastics are replacing aluminum cowling nose caps.

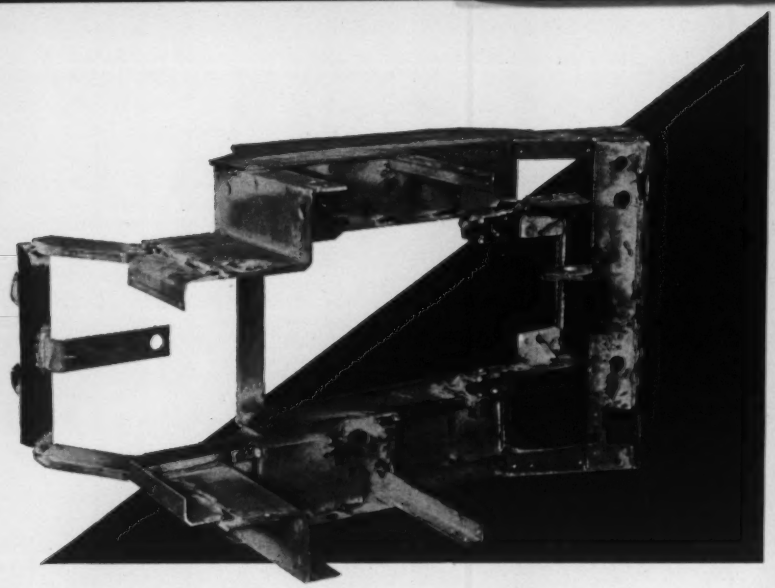
PANELS AID TANK BUILDERS—Tapered aluminum panels can cut costs up to 5 per cent for builders of large tanks, claims Reynolds Metals Co., Richmond, Va.

WOOD'S REALLY STRONG— Tiny, barely visible wood fibers are as strong as steel, says Mead Corp., Dayton, Ohio. It is investigating such fibers, particularly their bending mode, about which little or nothing is known.

PLASMA ELECTRICITY—First year of research with a magnetohydrodynamic (MHD) generator, capacity 200 kw, has demonstrated that power efficiencies are perhaps 40 per cent better than existing powerplants, states Avco Everett Research Laboratory, Everett, Mass., Avco Corp. A group of electric power firms is sponsoring the research.

UNDERGROUND ELECTRIC CABLES—Growing urban populations, increasing demand, plus research into ultrahigh voltage transmission might force power companies into underground transmission systems, say J. M. Oudin, Cables de Lyon, Lyon, France, and R. A. Tellier, Electricite de France, Paris. Their suggestion to participants at a summer meeting of the American Institute of Electrical Engineers: External, forced cooling. It would permit transmission of 1 million kva at 500,000 volts for perhaps 1¼ miles.

How to Exploit New Technology In Surface Preparation



Welded lift truck frame is discolored, covered with flux and scale . . .

• PRACTICE often lags technology in the preparation of metal surfaces for plating, painting, or other finishing operations. How wide is the gap? What can metalworking managers do to close it?

To get the answers, STEEL queried authorities on grinding, blast cleaning, brushing, tumbling, and plating. Their advice covers: Where techniques can be used to advantage; ways to reduce processing costs while improving the product; and practices that are best avoided.

• Some finishing difficulties are attributed to inadequate knowledge of metal surface characteristics.

The coating chemist could give more consideration to metal analysis and processing prior to painting or plating, says a leading steel producer. Use of copper bearing steel instead of a plain carbon grade is said to increase paint life 25 to 50 per cent. Use of a low alloy, high strength steel generally leads to a 100 per cent increase.

Many finishers are familiar with difficulties in painting aluminum, but fabricators often forget that aluminum coated or aluminum-silicon coated steels present the same problems.

Galvanized steels present a wider variety of finishing problems than any other materials because of the wide variation in surfaces. Chemical treatments applied to galvanized steels by the producers—for prevention of white rust—often affect final finish. If complete information on the treatment and its effect on the finishing system isn't available, the galvanized stock should be purchased in the oiled condition, rather than the chemically treated.

Hot phosphate treatments are said to minimize painting problems. But if the phosphatized, galvanized steel is stored for some time in a damp area, paint that's applied later tends to blister. Blistering can be avoided by prebaking the phosphatized, galvanized steel. When the stock isn't phosphatized, care must be taken to insure coating adhesion. Wash primer pretreatment, zinc dust paints, and cement-in-oil paints are said to be beneficial.

Varying amounts of oil are often left on terne plate and hot dipped tin plate. Failure to remove the oils can cause serious peeling of synthetic finishes.

Hot dipped tin plate is often used as a test base for paints that are to be applied to other surfaces. One authority says that such a surface is representative of nothing but hot dipped tin plate. And surface properties are said to be different on the hot dipped and electrolytic products. The coating weight, surface finish, and chemical or oil treatment of each manufacturer's tin plate should be evaluated with the coating to be applied. Such testing can prevent overcuring, undercuring, loss of adhesion, and discoloration.

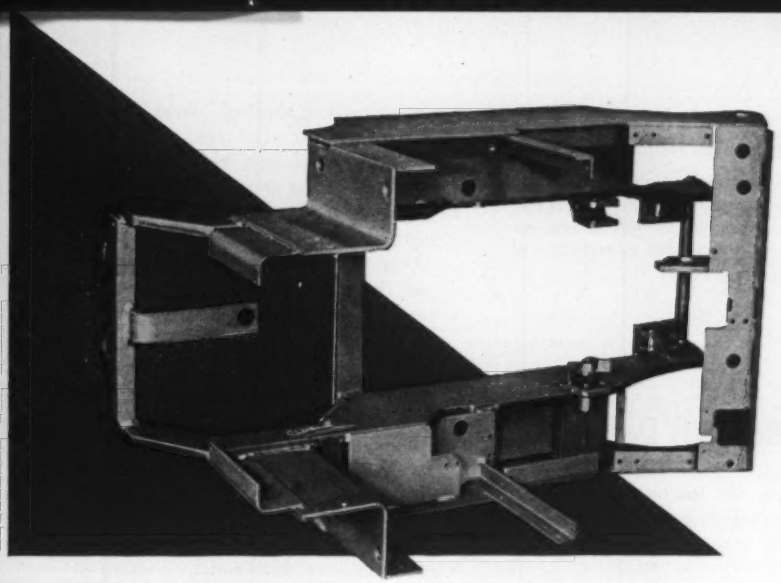
• Most metalworking managers should keep a more accurate account of finishing costs. And they must maintain quality standards.

"Finishing costs, especially those for surface preparation, are too often lumped into a round figure," says Stanley L. Johnson, manager, new methods development, Coated Abrasives Div., St. Paul, Minnesota Mining & Mfg. Co. "A low figure can be disastrous, and a high figure can price the product out of its competitive market. It's absolutely necessary to know what costs are.

"Many steel buyers think they are saving by purchasing a low commercial grade of steel. A saving of 1 to 3 cents a pound on the steel is often accompanied by a 6 or 7 cent per part increase in finishing costs. But inexpensive tooling and procedures, added by the finishing department, can help produce a profit, even when low grade steel is used."

Formulas for the estimation of polishing costs have been developed. One of them, devised by Minnesota Mining, correlates cost with the amount of metal removal required to make a given surface acceptable for painting or plating. The formula is based on a change in root mean square (surface roughness); weight of stock to be removed varies for different materials.

Each application requires a different approach for grinding and finishing accuracy. Example: One manufacturer was finishing stainless press plates to a close tolerance for the laminate industry, while another firm was making restaurant range tops from hot rolled plates. Both manufacturers used the same type abrasive belt machine. The press plate manufacturer found that high



Grit blasting provides a clean, etched surface that holds paint well

areas had to be ground off carefully before heavier pressures could be applied. But the maker of range tops was able to set machines for a large initial cut at relatively slow table speeds.

• Many firms fail to follow recommendations for good grinding results.

"The commonest shortcomings in surface preparation stem from failure to put proper emphasis on grinding variables," says Dirck Olton, manager of product engineering, Behr-Manning Co., Troy, N. Y., a division of Norton Co. "Some of those variables are selection of abrasive material, grit size, and sequence; type and treatment of backing and nature of adhesive bonding; speed of the abrasive belt; and feed speed of the work. Other important factors: Density of the contact wheel and spacing or angle of its serrations; type, quantity, or manner of application of lubricants or other grinding aids; proper filtering and exhaust systems; the metal being worked; and subsequent finishing methods.

"Readying a metal for plating requires a finish of 7 to 8 microinches rms, free from random deep scratches," says Mr. Olton. "Such a finish greatly reduces the need for heavy copper plating and subsequent costly rebuffing."

Other common shortcomings (dents, scratches, and burrs from handling) are being overcome in some plants by vacuum loading on conveyor lines, says Mr. Olton.

Titanium and other notch sensitive metals and alloys require extremely uniform finishing before fabrication, usually with silicon carbide abrasives, and in a carefully limited sequence of grit sizes. Generalization: Deeper contouring (as in automobile bumper stock or deep drawn stainless steel sinks) requires a particularly fine finish to prevent conspicuous opening of imperfections during the draw.

• Users of coated abrasives often select the wrong grain type for the material being finished, use improper abrasive speeds, grind in the wrong direction, or fail to maintain machines properly.

"Successful application of lubricants and coolants to coated abrasives requires a maximum of lubricant or other additive to prevent or retard loading, glazing, or welding of metal onto the abrasive," says Warren K. Seward, supervising engineer, market development and product application, Coated Abrasives Div., Carborundum Co., Niagara Falls, N. Y. He adds: "Insufficient lubrication reduces belt life, causes softening of heat treated parts, and makes buffing more difficult. It also impairs corrosion resistance of plated and unplated parts and makes it more difficult to apply satisfactory plating.

"Many finishing operations are done at improper abrasive speeds. Where grit sizes of 80 and finer are used for polishing with light pressure, belt speeds should be 5500 to 7500 sfpm. Coarser grit and heavier pressures call for speeds of 4000 to 6000 sfpm.

"Direction of grind can affect the finish produced, ease of later buffing operations, or quality of plate applied. Finishing in the wrong direction is often done in manual operations because it is easy for the operator to make the last pass on the part coming up on the wheel, or in the conventional grind direction. That produces a coarser finish with a torn appearance; it is difficult to brush out and a poor base for electroplating.

"Poor machine conditions can cause many difficulties, such as decreased belt life, poor finish, chatter, and operator fatigue. Worn bearings, undersize spindles, general machine looseness, and vibration are common sources of trouble. An out-of-round or out-of-balance belt contact wheel can cut efficiency as much as 75 per cent. It is surprising how many people wouldn't think of mounting a grinding wheel without dressing it for smooth performance; but those same people seldom show the same consideration for the abrasive belt contact wheel."

• Too often, the final finish is expected to conceal surface defects.

"The chrome plate is particularly sensitive to surface preparation practices," says John A. Mueller, manager of Carborundum Co.'s Bonded Abrasives Div. testing department. "Too rough a surface will show through the chrome plate; too smooth a surface will not provide proper adherence, and the plate will strip off the parent metal prematurely."

Bonded abrasives are often used to prepare surfaces for plating and painting. Example: Depressed center wheels are used to remove weld flash and blend the weld into surrounding surfaces before painting.

• Fabricators often overlook the benefits offered by abrasive barrel finishing or vapor honing.

"Success of subsequent operations depends largely on cleanliness of parts," says N. L. Watkins, product manager of Carborundum Co.'s Barrel Finishing Branch, Electro Minerals Div. "Metal particles, dirt, abrasives, oil, grease, and various encrustations must be removed. Barrel finishing offers such cleanliness

Abrasive Choice Is Important

"The most frequent production shortcomings in blast cleaning are improper selection of abrasive size and type, equipment malfunction, improper equipment, and too little knowledge of the type of surface required."

ROY W. OLSEN
Alloy Metal Abrasive Co.

Costs Must Be Well Defined

"Surface preparation costs are too often lumped into a round figure. A low estimate can be disastrous, and a high figure can price the product out of its competitive market. It's important to know just what costs are."

STANLEY L. JOHNSON
Minnesota Mining & Mfg. Co.

New Ideas Merit Ample Trial

"Basic producers ordinarily drop a proposed method if it isn't 100 per cent successful in its initial tests. We feel that a new practice deserves further investigation if its first tests indicate up to 75 per cent success."

E. P. FISHER
Osborn Mfg. Co.

Variables Must Be Considered

"The commonest shortcomings in surface preparation with coated abrasives stem from failure to put proper emphasis on grinding variables, such as the choice of abrasive, backing or adhesive, abrasive belt speed, and feed speed."

DIRCK OLTON
Behr-Manning Co.

as a bonus, beyond its primary function of deburring, polishing, or descaling."

In many cases, parts are rejected because burrs, sharp edges, or surface roughness aren't removed before they are placed in close fitting dies, jigs, or fixtures. Barrel finishing would improve the surface and produce a radius on the parts for better fit in dies or jigs, says Mr. Watkins.

Many electroplated parts are rejected because of metal buildup on sharp corners or burrs, poor plate adhesion, surface irregularities, and lack of color uniformity. Barrel finishing helps prevent such rejections. It is also said to be useful for removal of heavy scale from forgings, relieving stresses without work hardening the metal.

"Hand deburring operators often miss the burr in strategic areas," says Mr. Watkins. "In many cases, that difficulty is avoided by barrel finishing, which works the entire surface of the part."

Rough sand castings, which must be ground, polished, and buffed before plating, are often barrel finished first to reduce roughness. Polishing and buffing can often be eliminated by rough grinding, then barrel finishing.

Some authorities feel that finishing operations should be considered more seriously when parts are designed. Mr. Watkins tells of part costs cut in half by designing them so that all recesses are accessible to barrel finishing media.

Vapor honing, or fine particle, wet blasting is often used to remove burrs that cannot be reached by other methods. H. F. Patin, sales manager, Vapor Blast Mfg. Co., Milwaukee, says the method is extremely suitable when a small amount of stock is to be removed, and when a matte finish—desirable for holding lubricants, paints, or plating—is desired.

• Large parts, such as weldments or structurals, are often inadequately cleaned before they are painted.

Complete, airless abrasive descaling—cleaning to white metal—could be used to greater advantage on such items as road building machinery, fork lift trucks, tractors, and other material handling equipment. It provides a clean surface, slightly roughened, which makes for satisfactory bonding of the protective coat.

The method is said to make for savings in the fabrication of steel components, faster welding and painting, improved workmanship, and lower maintenance costs, especially in outdoor applications.

Savings can be made with airless abrasive cleaning of structural steel, says Wheelabrator Corp., Mishawaka, Ind. Rust corrosion, and mill scale, covered with a coat of paint, are costing industry and taxpayers millions of dollars a year in maintenance costs. It has been estimated that a repaint job on a bridge (including a thorough cleaning) comes to 6 or 7 per cent of replacement cost, so the original paint should be made to last as long as possible.

Nearly all structural steel fabricators make an attempt to remove foreign materials with some type of manual cleaning, but most of the surfaces fall short of the finish provided by airless abrasive cleaning, says Wheelabrator.

"Many fabricators paint right over the mill scale on hot rolled steel," says R. G. Hall, field sales manager, Pangborn Corp., Hagers-

town, Md. "But the scale doesn't form an impervious layer. It is loose and flaky; when it comes off, it takes the paint with it.

"Other fabricators use weathering and hand cleaning for surface preparation," Mr. Hall continues. "Steel is exposed outdoors to loosen the scale by rusting, then cleaned with hand scrapers or brushes before painting. But that procedure takes time, and the rust is as undesirable as the scale it replaces."

• Choice of abrasives for blast cleaning often gets too little emphasis.

"The most common production shortcomings in blast cleaning are improper selection of abrasive size and type, equipment malfunction, improper equipment, and too little knowledge of the type surface required," says Roy W. Olsen, vice president-production, Alloy Metal Abrasive Co., Ann Arbor, Mich. He continues: "Use of the wrong abrasive can produce a surface that isn't chemically clean or etched sufficiently to bond paint or plating properly.

"Production and technical men who have had considerable experience often encounter finishing problems beyond their knowledge. They must then be able to consult with manufacturers of abrasives and blast cleaning machinery for help in selecting the right abrasive. But use of the right machinery and abrasives doesn't insure a proper finish if the equipment isn't properly maintained, or if the abrasive stream is contaminated.

"High humidity can often have a serious effect on blast cleaning prior to plating. After cleaning, the exposed surfaces oxidize readily. And moisture on the metal abrasive can interfere with proper flow from the centrifugal wheel or air blast nozzle."

• Often lacking: Followthrough on proposed production changes, or thorough investigation of methods that don't seem 100 per cent effective on first trial.

Advice isn't helpful unless it is heeded, and benefits can be gained from advances in technology only when production methods are modified. You may find ways to close the technology-production practice gap in your own plant, without looking too far. E. P. Fisher, manager, finishing machinery sales, Osborn Mfg. Co., Cleveland, sums it up with this comment:

"The recommended method is usually expected to improve quality and in most cases will increase product cost. The product may be a competitive article; the producer will hesitate to pass an increase along to his customer, and he doesn't want to assume increased manufacturing costs. Result: A delay in adopting the new method. He will continue to risk customer complaints, or rework material to avoid adding any new cost. Example: Two years ago, our company recommended wire brushing a product after pickling to remove carbon smut from a steel surface that was to be plated without buffing. The method hasn't been adopted, and the material gets a dull plated finish, instead of a bright one.

"We find that basic producers usually drop a proposed method if it isn't 100 per cent successful in initial tests. We feel that a new practice deserves further investigation if its first tests indicate as much as 75 per cent success."

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Belts Need Adequate Cooling

"Insufficient lubrication reduces abrasive belt life, causes heat treated parts to soften, and makes buffing more difficult. It also impairs corrosion resistance, and makes it more difficult to apply satisfactory plating."

WARREN K. SEWARD
Carborundum Co.

Surface Is Vital in Plating

"Chrome plating is particularly sensitive to surface preparation practices. Too rough a surface will show through the plate; too smooth a surface will not provide proper adherence, and the plate will strip from the base metal."

JOHN A. MUELLER
Carborundum Co.

Mill Scale Won't Hold Paint

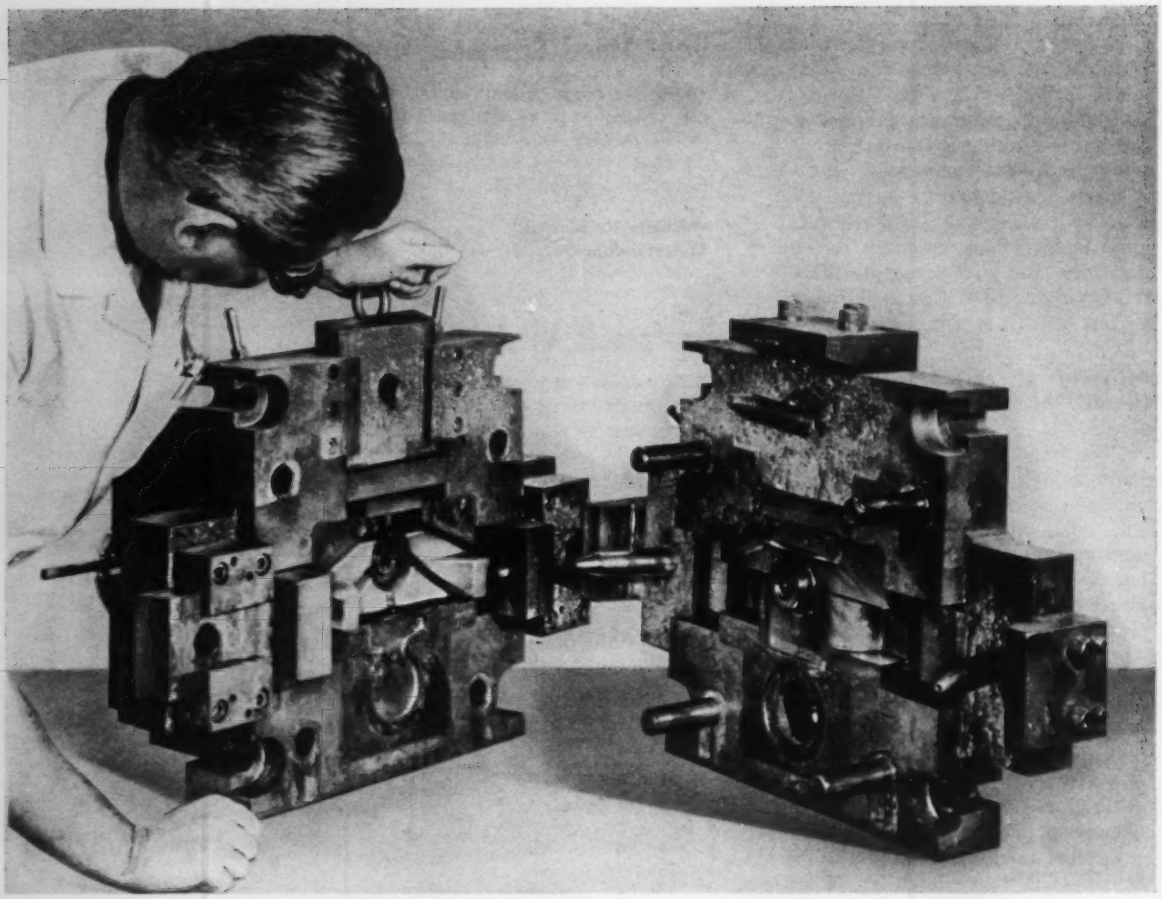
"Many fabricators paint right over the mill scale on hot rolled steel. The scale doesn't form an intact surface; it is loose and flaky. When it comes off, it takes the paint with it."

R. G. HALL
Pangborn Corp.

Barrel Finishing Cuts Rejects

"Many electroplated parts are rejected because of metal buildup on sharp corners or burrs, poor plate adhesion, surface irregularities, and lack of color uniformity. Barrel finishing helps prevent such rejections."

N. L. WATKINS
Carborundum Co.



Nitrogen is a key component in a hot work steel. In service, the . . .

New Die Steel Resists Erosion, Heat Checking

• NITROGEN helps to build the hardness of a new hot work tool steel. It's a high chromium, low carbon type with good resistance to heat checking and erosion, and it works well in a number of high temperature applications.

Called Cromo-N by the producer, Bethlehem Steel Co., Bethlehem, Pa., the steel has been tried in diecasting dies and extrusion dies and mandrels. Excellent service life is reported.

• Reducing the carbon content aided in building heat checking resistance.

Heat checking, a common problem in high temperature dies, is the result of many cycles of heating and cooling during diecasting and extrusion. It's a complex phenomenon; Bethlehem metallurgists believe that corrosion fatigue and stress corrosion cracking may be contributing factors.

One way to reduce heat checking is to cut the carbon content of the steel. That reduces hardness, so the reduction in heat checking is obtained at the expense of wear resistance and strength if the only change made is in the carbon content.

• Nitrogen additions raised hardness.

One way to approach the problem of holding hardness is to add nitrogen. The amount that can be retained in the steel is dependent on other elements present. A high chromium steel was used for the tests. Chromium helps to hold the nitrogen, and it adds corrosion resistance.

While martensitic hardness is primarily a function of the carbon content, a balance can be struck between carbon and nitrogen.

• First trials were encouraging.

Nitrogen was added to a 9 per cent chromium steel with a carbon content of 0.20 per cent. The required nitrogen was determined to be 0.07 to 0.12 per cent.

Laboratory tests of small heats led to the production of a 7 ton electric furnace heat. Some of the heat was retained for physical property studies, and some was made into diecasting die parts and mandrels for the hot extrusion of copper base alloys. Service life was better than other hot work grades in those applications, showing that improved results could be obtained.

• Further changes aided heat treatment.

A series of hardening trials showed that the modified steel required hardening at 1950 to 2000° F. Reducing the hardening temperature would make for easier heat treatment, if it could be done without changing the basic analysis. Bethlehem metallurgists decided to try nickel additions to lower the hardening range.

Experiments on 30 lb heats showed that additions of 0.75 per cent of nickel could drop the hardening range by 100° F.

Based on the laboratory results, a 7 ton electric furnace heat of the modified analysis was turned out. Melting, casting, forging, and rolling of the heat were within usual production conditions; no particular difficulty attributable to the nitrogen was noted.

Maximum hardness was obtained in the 1875 to 1925° F hardening temperature range.

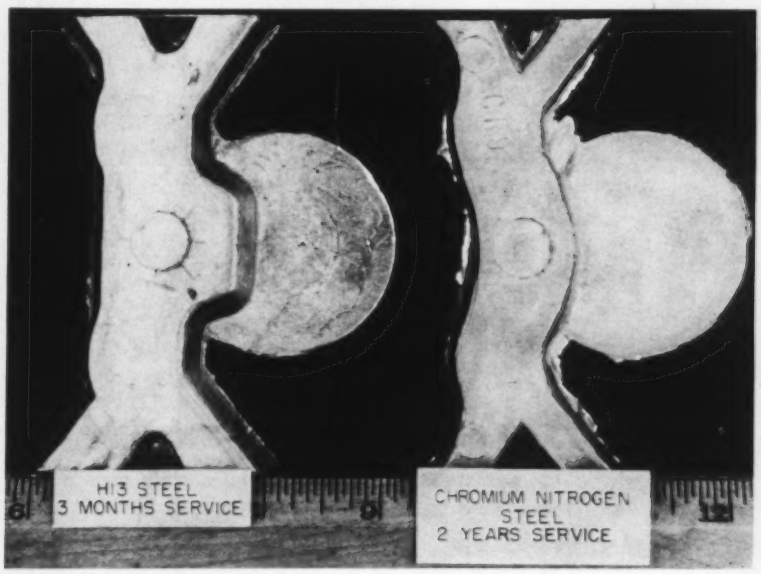
This typical analysis has been selected for Cromo-N:

Carbon	0.23%
Manganese	0.60%
Silicon	1.25%
Nickel	0.75%
Chromium	10.00%
Molybdenum	1.20%
Vanadium	1.00%
Tungsten	0.45%
Nitrogen	0.10%

Air quenching Cromo-N from 1900° F (preheating at 1300 to 1400° F is recommended) produces a hardness of 52 to 53 Rockwell C. Tempering at 1025° F gives the steel a hardness of 48 Rc, which is recommended for best wear resistance; raising the temperature to 1050-1100° F drops the hardness to Rc 45-39 for best shock resistance.

Service tests have shown improvements of as much as 10 times over other analyses for center gate blocks, Bethlehem finds.

Aluminum diecastings removed from the center gate area demonstrate results of using the new steel. Roughness due to heat checking (left) has not developed in two years' service with die made of Cromo-N



Test Shows Machinability Of Pearlitic Malleable

• MACHINE SHOP operators are often satisfied a little too easily with their machining knowhow, say the experts. Paradoxically, the specialists, those who live with the pseudoscience of metal cutting, are more dissatisfied with what they know about the fundamentals of chipmaking. They continue to test.

Case in point: The Malleable Founders Society, Cleveland, sponsored a machining project at Metcut Research Associates Inc., Cincinnati, to find out how malleable iron ought to be machined.

• New data reveal more about the machinability of malleable iron castings.

Ferritic grades of malleable iron can be worked more easily and faster than many free cutting steels. And the hardness of the workpiece is not an adequate indicator of malleable's machinability.

In comparing three grades of pearlitic malleable iron with ductile and gray irons of similar hardness, the tests showed one grade of pearlitic malleable was greatly superior, another about equal in machining characteristics, and another not as good as the other two materials.

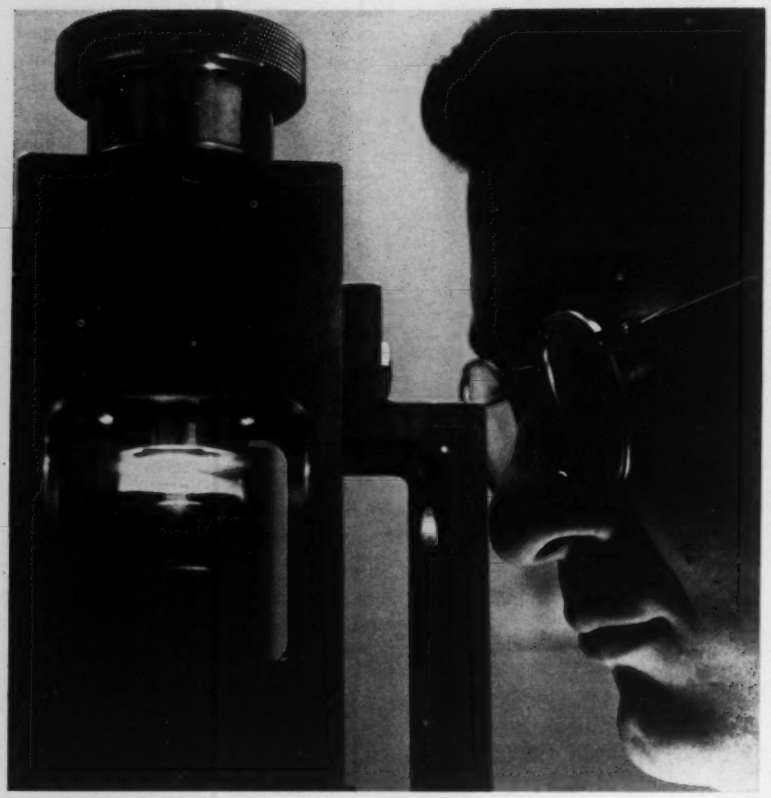
• Microstructure is your best guide to machining results.

The society reports: Although malleable is a ductile engineering material, carbon is contained in its matrix, and it contributes a lubricating effect between the tool and the workpiece. It also helps to form discontinuous chips which create less resistance against the tool.

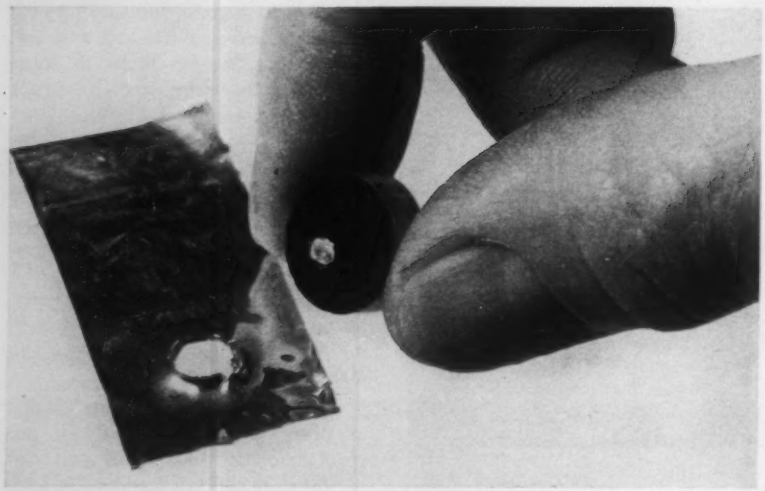
When running finish cuts, the best cutting speed for a feed of 0.007 in. a revolution was found to be 300 to 600 surface feet a minute. At the high end of the speed range, tool life is about 30 minutes (to a 0.015 in. wearland). For 0.003 in. a revolution feed (for finer surface finish, for example), optimum speeds are 400 to 700 sfpm.

For roughing, coarse cuts (0.060 in. deep) at a feed of 0.003 in. per revolution, the best speed was 100 to 300 sfpm. For a feed of 0.007 in. a revolution, 300 to 700 sfpm worked best.

Can 3400 mph Water Bullets Do Machining?



Impact of high velocity liquid . . .



punches aluminum sheet, dents steel slug

• SINGLE DROPS of water, propelled at speeds up to 3400 miles an hour, blast small craters into steel and can pierce thin aluminum.

Further: 1. Uniform jets do more damage than irregular shaped drops. 2. Irregularities in the metal surface don't seem to affect the resultant crater. 3. Thin films of oil or water on the surface offer no resistance to the drops. 4. Visible damage, barely seen on the metal surface, seems to correspond to the actual threshold of water erosion damage experienced in the operation of steam turbines.

• Study of the effects on rapidly spinning blades led to the new findings on water behavior.

Scientists at Westinghouse's Research Laboratories, Pittsburgh, set out to find a solution to the problem that has always plagued turbine builders and users—erosion by water of the turbine blades. Similar erosion, they say, occurs on surfaces of airplanes and missiles when they collide with raindrops.

To study the nature of water impact, the scientists devised a machine that fires a drop at a time at metal surfaces under carefully controlled conditions. The supersonic water bullets are produced by compressed air. A small lead pellet is fired down a 30 in. metal tube by gas pressure (about 150 psi). The pellet strikes a small sealed reservoir of water. On impact, the lead pellet squeezes a single jet of water out of a tiny opening in the reservoir. The water jumps a 1 in. gap and strikes the metal's surface.

There's still mystery about the impact. When the drops of water smack the metal surface, a peculiar light is given off. It shows up on photographs, like the one above.

• Goal of the test: To help select erosion resistant materials for steam turbine service.

Some metal cutting men will be watching closely to find out if the principle can be used to machine difficult metals.

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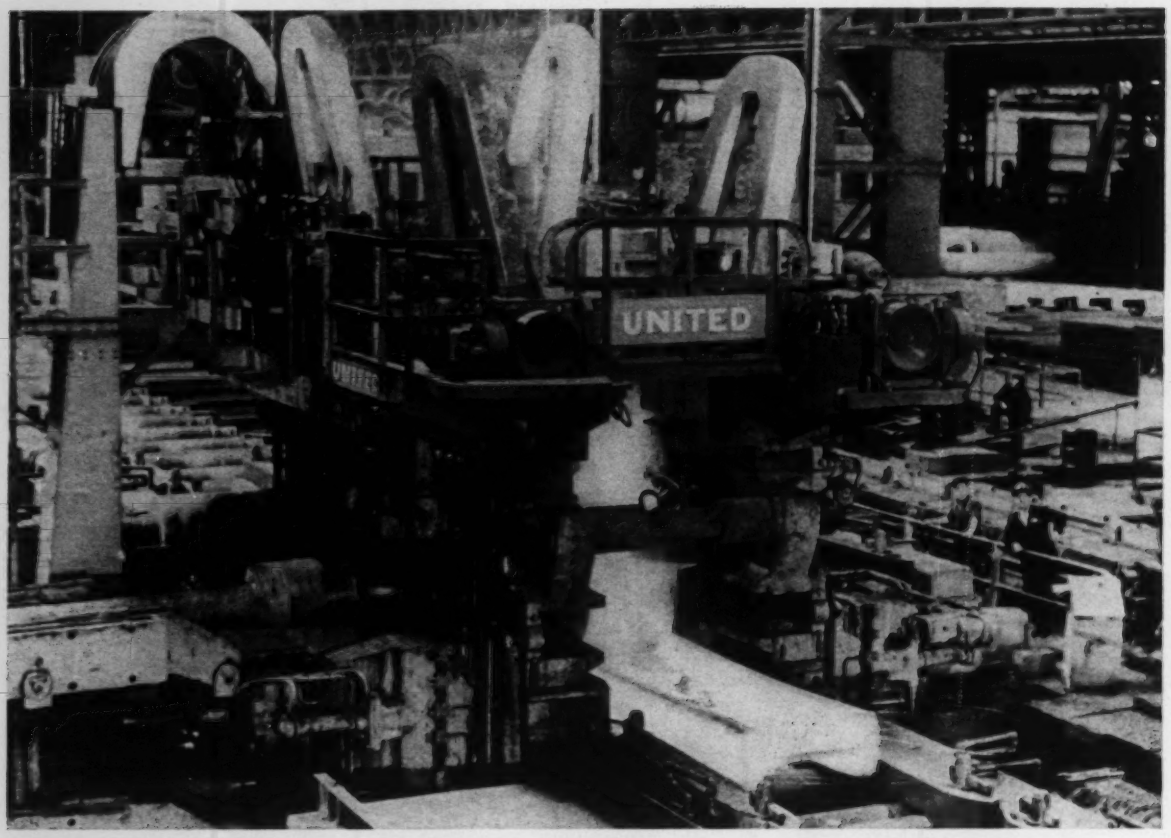

Design of this facility installed in England is being scaled up, permitting . . .

Japanese Structural Mill To Roll Bigger Beams

• LONGER SPANS in bridges and buildings may be a reality by the end of 1962. Wide flange beams with webs up to 40 in. deep and corresponding sizes in other shapes will be available from Fuji Iron & Steel Co. Ltd., Tokyo, Japan. They will be rolled on a mill that's on order from United Engineering & Foundry Co., Pittsburgh.

The mill is similar in design to a combination mill built by United for Dorman Long Co. Ltd., Middlesbrough, England. Structurals and wide flange beams up to 36 in. deep have been made at the company's Lackenby Works since 1958. (Beams of that size are being rolled on larger mills in the U. S.)

• Versatility of the English mill will be duplicated at Fuji.

Changes in mill design will make for less expensive rolls, faster and semiautomatic roll changes, says United. It will be able to change quickly from wide flange beam rolling to production of standard structurals, such as piling, bars, angles, channels, and standard beams.

The Japanese mill will have about the same flexibility as its English counterpart, which can be set up to roll universal beams from shaped blooms without reheating; rectangular blooms for rerolling at other works; or billets from rectangular blooms that have been reheated. A change in the traffic pattern can adapt the mill to roll universal beams from shaped blooms that have been reheated and billets from rectangular blooms without reheating.

• Beam production shows typical path of steel in process.

Shaped blanks from the blooming mill are cropped, then rolled on two, universal roughing stands—a two high, edging stand and a universal stand that's equipped with electrically driven, top and bottom screws and motorized screws on the vertical rolls. Horizontal rolls are driven through a pinion stand, and vertical rolls are driven by the beam in process. Finally, the piece passes through finishing stands, similar in arrangement to the universal rougher.

SLABBING MILLS

Designed and Built by MESTA

Rolling 20 Ton Ingots into
Slabs on a Mesta 45" x 90"
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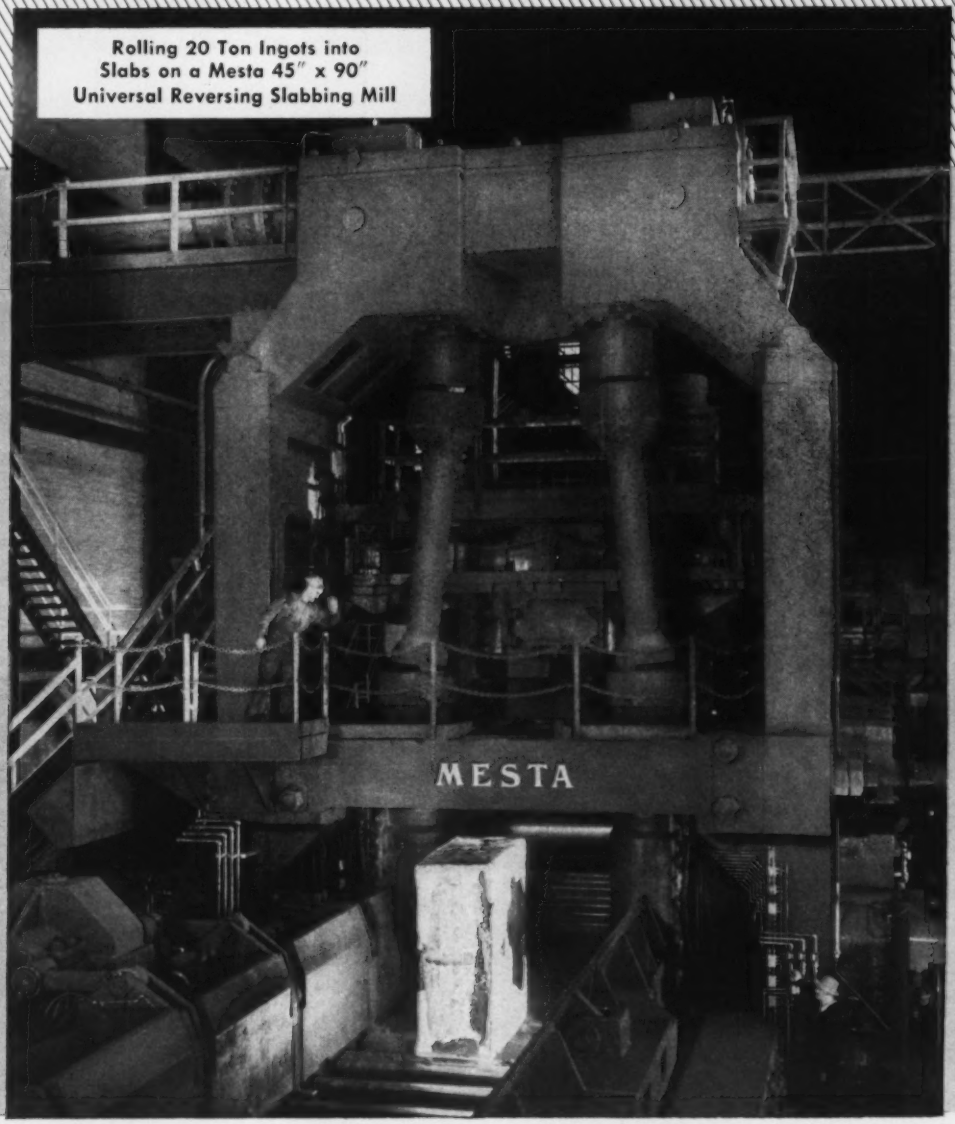

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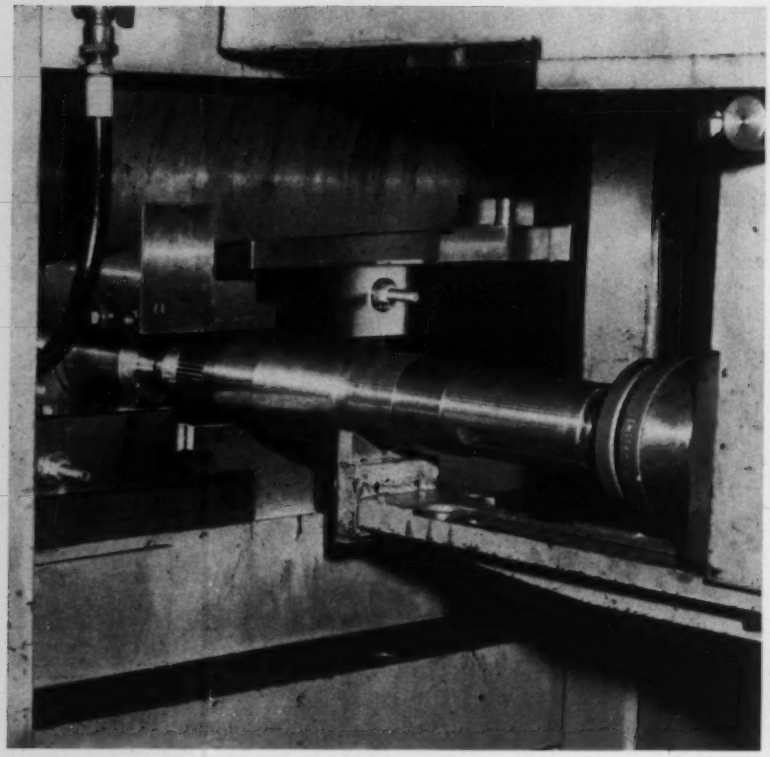
Mass Production Method Scores in Short Runs



• SEVENTY DIFFERENT shafts are splined and threaded in short runs at the Gearing Div., Westinghouse Electric Corp., Pittsburgh. The job is done by a chipless machining technique that's normally reserved for long, continuous production runs.

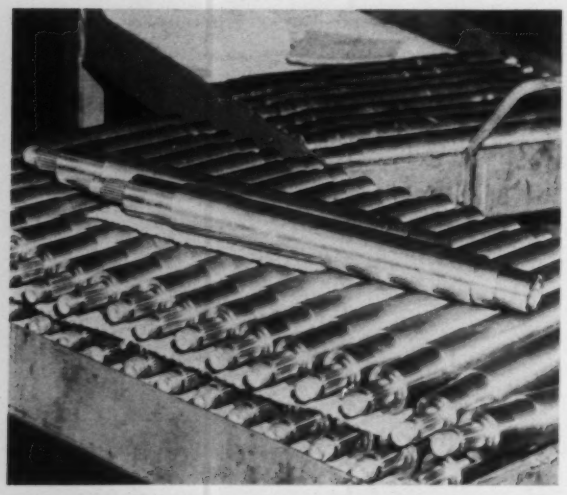
The shafts represent a wide variety of combinations, including spline and thread, diameter, spline length, thread length, and over-all shaft length.

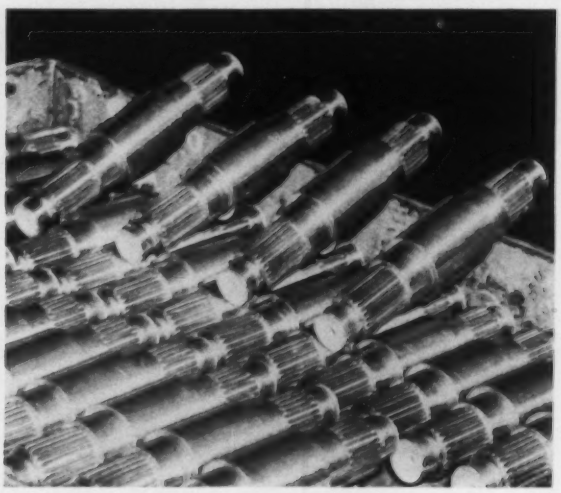
Production runs vary from 5 to 200 pieces, but they can be scheduled so that rack changing (the slowest part of a new setup) is kept to a minimum. The technique has proved so successful, both in product quality (metal is cold worked rather than machined) and in reduced production costs, that it has been adopted as standard at the plant.

The complete job range covers nine spline sizes (taking four different rack sets); spline lengths vary from 11/16 to 2 11/16 in.; shaft length varies from 4 to 40 in.; threads range in nine sizes from 7/16-20 to 1½-12, and each requires its own set of racks; thread lengths vary from 5/16 to 15/16 in.

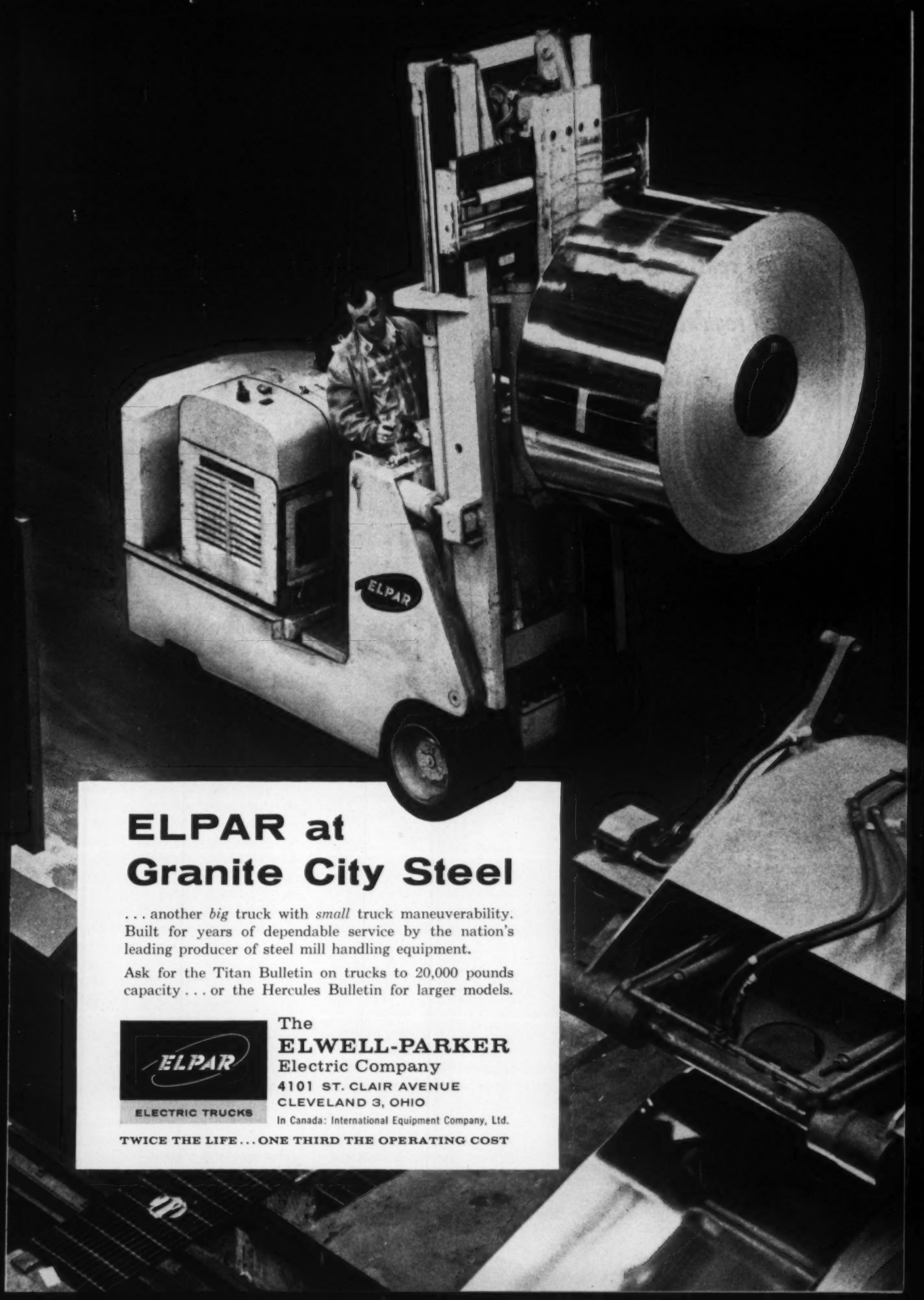
A new setup takes about 2½ hours when a complete changeover is required. But when only thread racks have to be changed, setup takes only 30 minutes.

Spline rolling has been used mostly in volume work, but . . .





Parts like these are rolled economically in job lots



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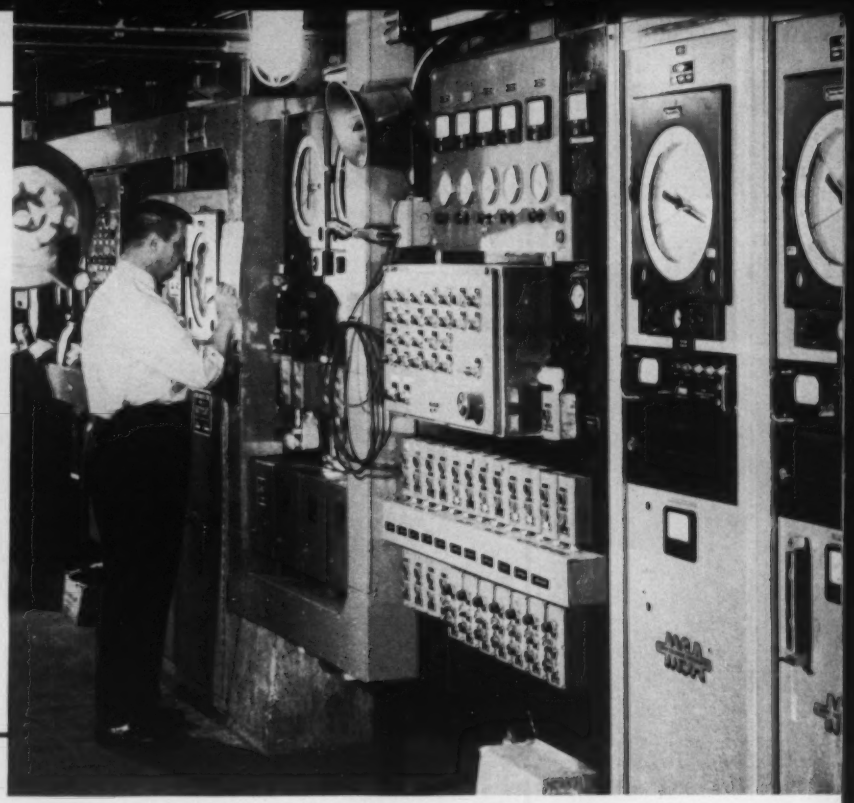


Pneumatic Controls Automate

• **LOOK for more pneumatic, variable speed controls to be used in the automation of continuous processing lines. One of the successful applications: Constant ratio regulation of roll speeds in strip drying ovens at Enamelstrip Corp., Allentown, Pa., a subsidiary of National Steel Corp.**

The control system, which is said to be adaptable to virtually any facility that handles strip, was supplied by Reeves Pulley Div., Columbus, Ind., of Reliance Electric & Engineering Co.

• **Uniform quality is insured by steady strip speeds in the double drying oven.**

Strip up to 48 in. wide passes through either or both of the oven sections, at 50 to 300 ft a minute. Speed of the stock must be held steady to obtain a smooth, uniform coating.

"We can't obtain a product finish that is acceptable to our customers with a jerky drive system," says Joseph Schierlein, factory superintendent. "The control system keeps stock moving at the same velocity over the bridle drives and oven top rolls. And the ratio of roll speeds in the oven is constant."

Uniform velocity changes for all rolls help meet curing requirements for each type product. Individual drive speeds can be regulated to correct for roll wear.

• **Quick response to control changes makes for a wide range of coated products.**

"The master and individual control system shows extremely fast response," says Wallace A. Shelby Jr., assistant to National Steel's vice president-engineering. "The operator sets the speeds he needs on all five drives in the system by turning only one control knob. Almost instant reaction by the drive makes it possible to adjust operating conditions to meet changing production requirements."

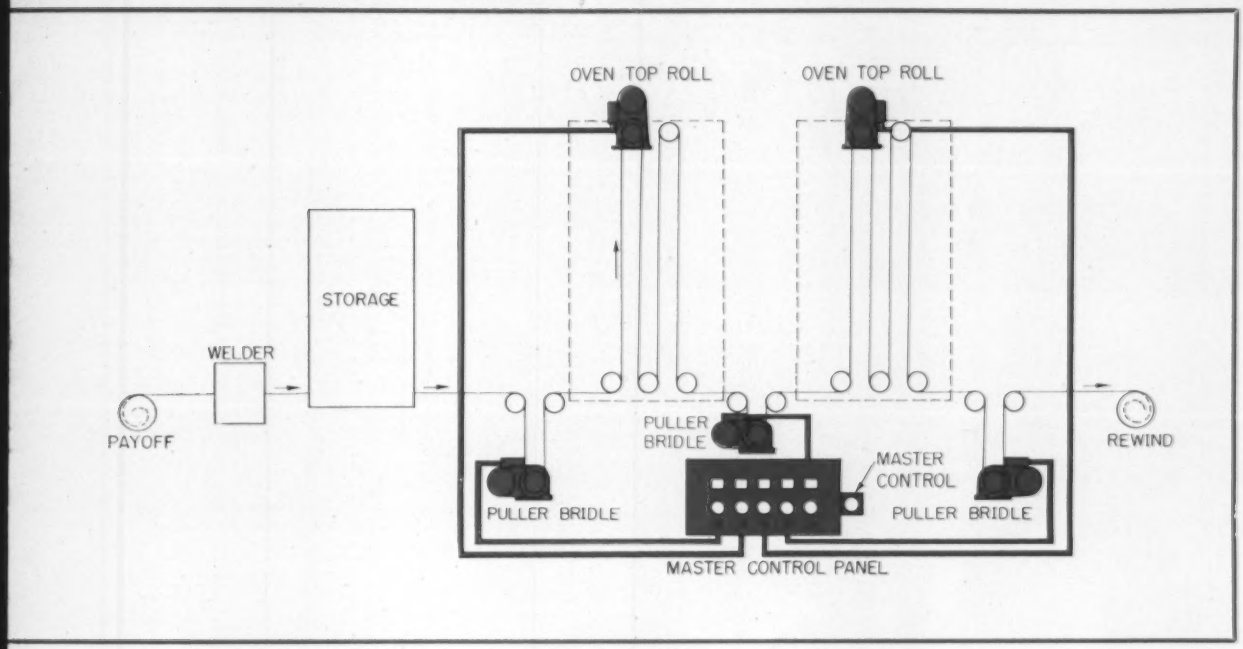
Output from the line is determined by the time-temperature curing cycle required for each product. The strip may be coated on one or both sides; different coating types or colors may be applied to opposite sides of the stock; or coatings may be of different thicknesses.

• **Modest capital investment and low operating cost make automation even more attractive.**

Relatively simple, pneumatic circuitry makes it possible to control all drives from one panel. The line operator can change process speed by adjusting a master control, which supplies equal reference air signals of 3 to 15 psi to air loaded regulators. Each regulator then applies a speed control air signal to one of the drive motors. Result: Output speeds that are proportional within 2 per cent.

The operator can change the speed of each drive without interfering with the others. Speeds can be preset when the line isn't running; a three way solenoid valve prevents the air signal from actuating the speed control before the drive motor is started.

Pneumatic controls are used for other drives in the line. Example: Exhaust fan drives are controlled



Enamelstrip Line

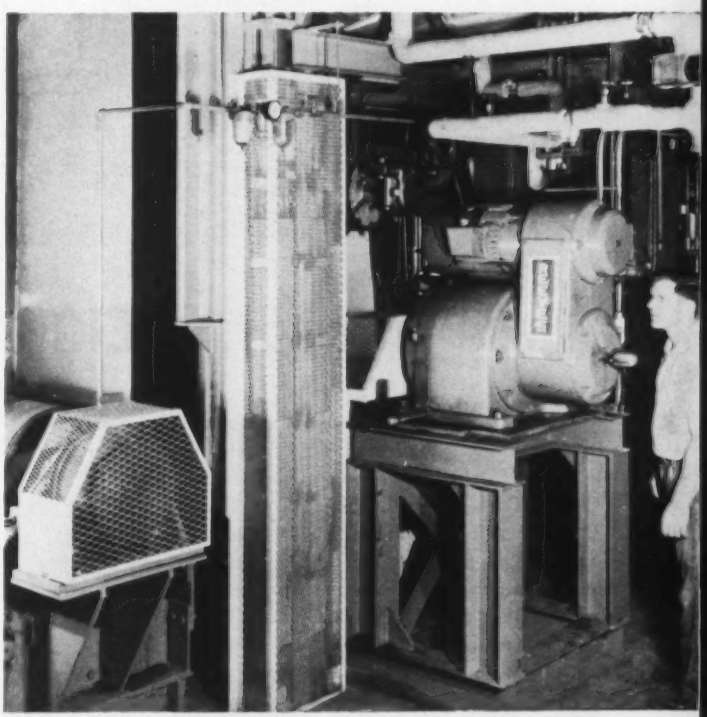
by a gas analyzer that actuates motor regulators. Operating and maintenance personnel are required to be familiar with only one basic type of variable speed equipment.

• **Maintenance is minimized. And modifications can be made in the system by unspecialized service personnel.**

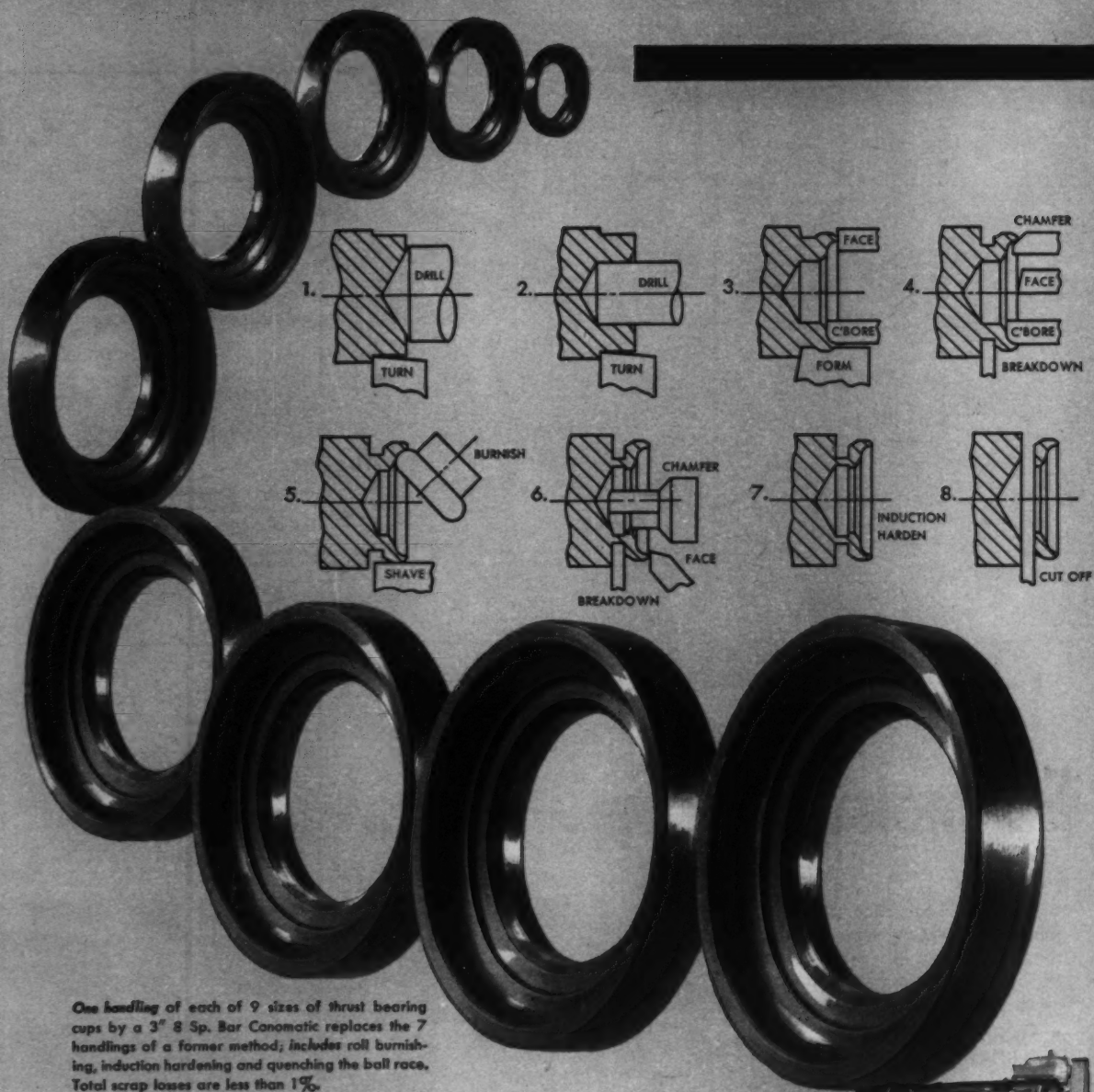
Enamelstrip personnel installed a third puller bridle drive in the system without assistance from Reeves (the original design called for only two bridle drives). The response of the system wasn't changed when the drive was added.

Limited space between the two oven sections made for some difficulty in mounting the additional drive, says Mr. Schierlein. But only a few quick air connections were needed to tie in the system control.

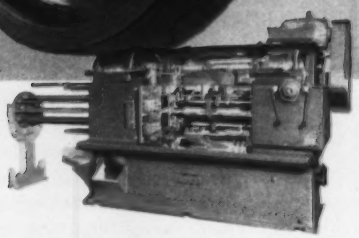
The original control panel included a master regulator and a regulator for each drive. In the converted system, individual drive controls are mounted on the main panel; the master is on an auxiliary mounting.



BRIDLE DRIVES and oven top rolls carry strip at 50 to 300 ft a minute; speed must be steady for smooth, uniform coating



One handling of each of 9 sizes of thrust bearing cups by a 3" 8 Sp. Bar Conomatic replaces the 7 handlings of a former method; *includes* roll burnishing, induction hardening and quenching the ball race. Total scrap losses are less than 1%.



Those cost-saving EIGHTS!

With more work spindles and tooling positions for including — in one chucking — operations that would otherwise require the expense of second handling, you just can't *beat* THOSE COST-SAVING EIGHTS.

Likewise, as replacements of four spindle machines — on more simple work — with double stock feed and double setup, producing two pieces per cycle, nothing *compares* with THOSE COST-SAVING EIGHTS.

For ever-increasing work requirements — in less floor space, with less power, less coolant, less lubricant and maintenance, and less transfer and paper work — many "automatic" users are finding THOSE COST-SAVING EIGHTS more *profitable*. How about *you*?

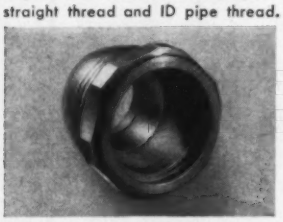
Write, wire, or phone *today* for particulars. There is no obligation. Cone Automatic Machine Company, Inc., P.O. Box 27, Windsor, Vermont.

Conomatic

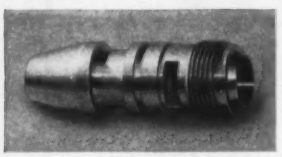
World's Most Productive Line of Automatic Lathes

Consistent, *dependable* handling of one or more of the following operations in a single setup has earned the CONOMATIC an enviable reputation as the *leader* of THOSE COST-SAVING EIGHTS: cross drilling and milling, end milling, broaching, spinning, stamping, OD and ID burnishing, eccentric drilling, turning and boring, eccentric forming, multiple hole drilling and tapping, oil groove rolling, back facing, back slotting, back hole drilling and counterboring, induction hardening and quenching.

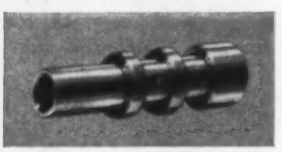
One handling of this SAE 1113 stud by a 1⅛" 8 Sp. Bar Conomatic *includes* rolling one OD pipe thread and cutting the other. Also *includes* cutting OD straight thread and ID pipe thread.



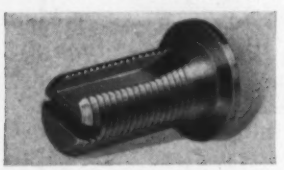
One handling of this Ball Joint Housing (1012 steel) by a 2⅜" 8 Sp. Bar Conomatic *includes* burnishing inner ball race.



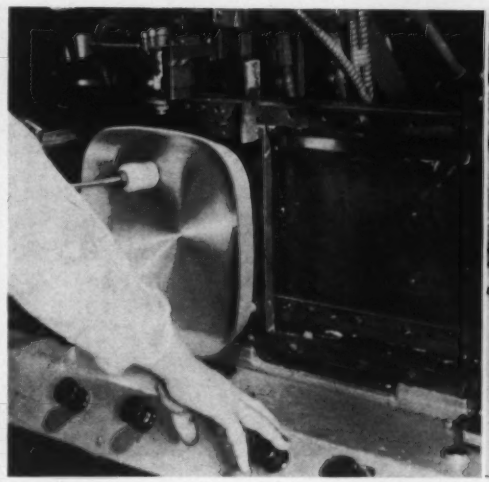
One handling of this Sleeve (B-1112 steel) on a 1⅜" 8 Sp. Bar Conomatic *includes* offset milling.



One handling of this Valve Bushing (8620 steel) by a 1" 8 Sp. Bar Conomatic *includes* cross drilling of 4 holes and back counterboring of large hole.



One handling of this Threaded Stud on a 1" 8 Sp. Bar Conomatic *includes* cross milling, slotting, thread chasing, and back facing (all operations without stopping the work spindles).



Six seconds in this fixture demonstrates . . .

How Arc Spotwelding Simplifies Terminal Joining

• **ARC SPOTWELDING has improved the joining of electrical pins to bases in automatic aluminum frying pans, says General Electric Co., Schenectady, N. Y.**

Only 6 seconds are required to make a joint, the firm says. In addition, quality of the joining has been improved so much that a testing operation has been eliminated, along with the need for some reworking.

• **The automatic arc spotwelding fixture is fast and reliable. Reasons: Accurate positioning, pushbutton control of the cycle, and a pilot arc starting device.**

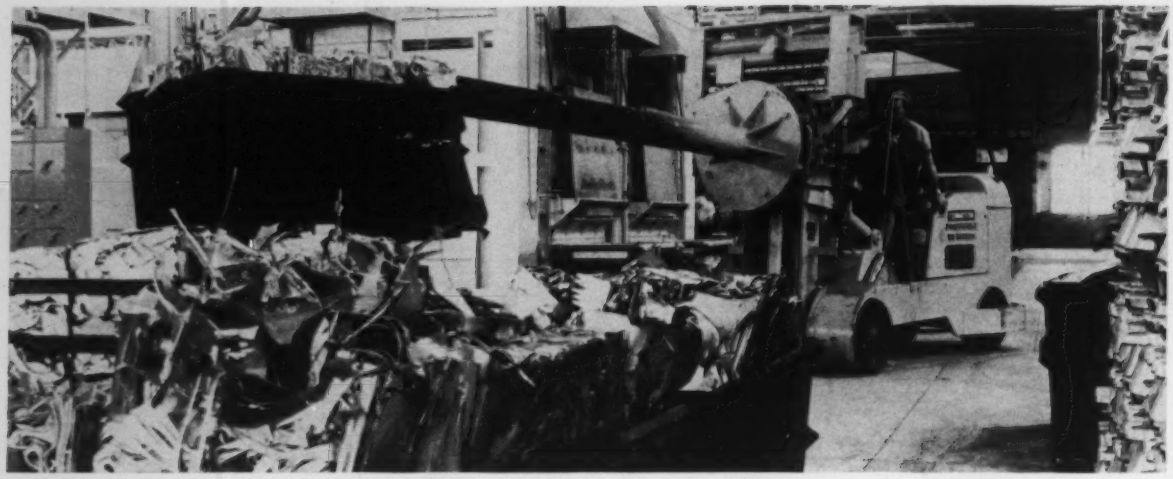
The electrical terminals must be waterproof. Cast heating elements terminate in stainless steel deadpins. An Everdur alloy cap fits over the stainless deadpins, spacers, and waterproofing washers to insure good electrical contact.

Prewelding preparation consists of removing magnesium oxide from the 0.090 in. deadpins on the heating element. Parts are then assembled and the vessel placed in the welding fixture. A Heliarc torch comes down onto the pin making two fusion arcspots to join the caps and pins. No postweld cleaning is necessary.

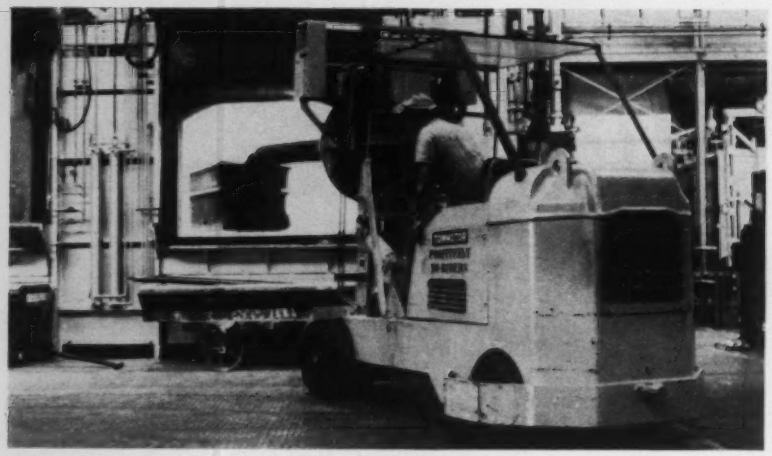
A high frequency current has been commonly employed to start an arc between the work and a nonconsumable electrode. Linde Co., a division of Union Carbide Corp., New York, which makes the Heliarc welding equipment, employs a tiny pilot arc which is maintained constantly with a 5 ampere current and a small amount of argon shielding gas.

Advantages include: No high frequency radio interference problems, no electrode contamination (they last four times longer), and improved process reliability.

General Electric formerly brazed the caps to the pins. The amount of flux and the size of the alloy slug were difficult to control, causing quality problems.



Scrap pickup and furnace charging . . .



Now takes one man instead of four

Lift Truck Makes Furnace Charging 2½ Times Faster

• A SPECIALLY equipped fork truck increased furnace charging speed 250 per cent at Mirro Aluminum Co.'s rolling mill, Manitowoc, Wis. Other advantages are also cited:

• Furnace fuel savings—doors are open only a fraction of the time formerly required.

• Reduced manhour requirements—the lift truck operator does the work that formerly required four men per furnace. Charging time is now about 23 minutes. The company plans to use the unit to handle other furnace installations.

Continuation of manual charging was considered impossible by Mirro when it installed two furnaces of about 45,000 lb capacity each. Reason: Fast moving production schedules and the high capacities of the furnaces.

So Mirro selected a Model 900, fork lift truck (Towmotor) equipped with a 180 degree rotator and extension mounted, adjustable spread forks to mechanize charging.

• During the charging process, huge boxes carrying 2000 to 3000 lb of scrap are securely held by the hydraulically operated forks which slide into slots in the bottom of the boxes.

At the furnace, the furnace charging attachment is rotated and the contents of the box are dumped. The truck then withdraws from the furnace and returns to the scrap area for another load.

Ingots or large bundles of 50 lb pigs are grasped at the sides by the adjustable spread forks. At the furnace, they are set down gently on the melt.

Safety shields on the truck protect the operator and tires. The company hasn't had any truck maintenance problems traceable to exposure to heat.

stainless steel adds sales appeal.
the car designed with stainless steel looks better when you buy it and is worth more when you sell it.

McLOUTH STAINLESS STEEL

McLouth Steel Corporation · Detroit 17, Michigan

Look for the **STEELMARK** on the products you buy

THE BIG WHEEL

with lots of Pull for your heaviest loads

Here's a close-up of the MONOTRACTOR — a deluxe, durable MonoRail drive system that's built for dependability and cost saving performance.

That spring loaded rubber tire drive wheel rides any smooth bottom track with the dependable traction needed to take heavy loads up inclines, down inclines or around curves. Track flanges and wheel treads wear indefinitely because wheels do not slip or spin and no extra weight is needed for traction.

Automatic Handling with Monotractors

Use Monotractors with:

1. Station Selectors
2. Selective Automatic Switching Devices
3. Electrical Block Systems
4. Automatic Trains
5. Automatic Loading Devices
6. Automatic Selective Discharge Systems
7. Cycle Control Panels

Write for Bulletin C-2

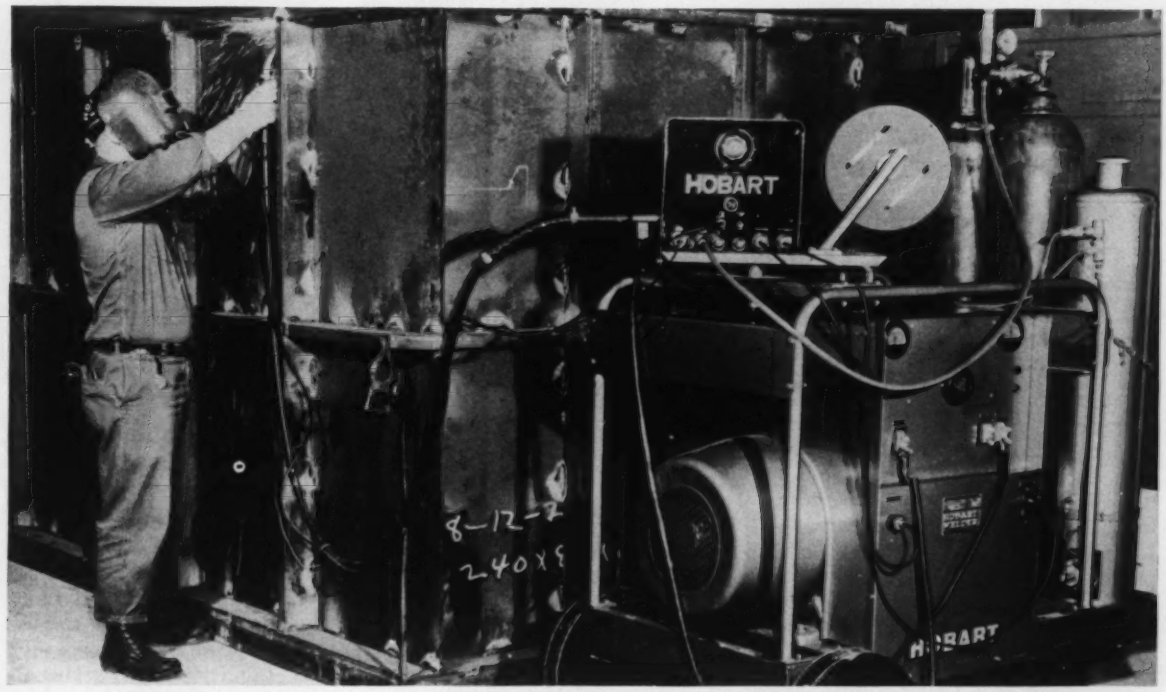
ENGINEERED MATERIALS HANDLING

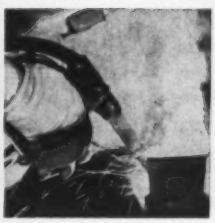
1102 EAST 200th STREET CLEVELAND 17, OHIO

AMERICAN MONORAIL

DIVISIONS: Conveyor Division, Tipp City, Ohio — Canadian Monorail Co., Ltd., Brampton, Ont.

Welder Handles Six Semiautomatic Processes





HOBART'S new welding machine, the Multiwire, is being offered in line with the industry's latest attempt to simplify selection by metalworking management of semiautomatic welding processes.

By purchasing a single unit, you can employ any of six processes for joining steel and nonferrous metals: Small wire, CO_2 shield; large wire, CO_2 shield; flux filled, tubular wire with CO_2 shield; aluminum or soft wire with an argon or helium gas shield; submerged arc; or flux filled, tubular wire alone. Each change takes only a few minutes.

Other features include: Water cooler and circulator that looks like a gas bottle; a demountable, four roll wire feeder; a wheeled truck that carries the equipment and accessories. The unit is rated at 500 amperes, 40 volts, continuous duty. Voltage slope selection is provided by three mounting lugs on the panel—maximum, medium, and flat.

• **Major Overseas Unit**—The Multiwire, a motor-generator set, was introduced at a recent distributors' meeting as the spearhead of a program to increase Hobart's foreign business.

U. S. welding units are competitively priced because, unlike European counterparts, they are mass produced. "Even large manufacturers (in Europe) tend to subcontract all the details, limiting their activities to assembly and marketing the finished equipment. That practice tends to increase their costs to our advantage," says E. A. Hobart, president. U. S. products are

highly regarded in Europe, he adds.

Hobart's present foreign sales account for 20 per cent of its gross.

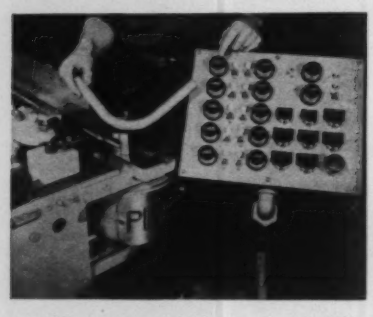
For further information, *write* Hobart Bros. Co., Troy, Ohio.

Unit for Bending Machines Speeds Frequent Changes

MORE PROFITABLE handling of bending operations requiring frequent setup and changeover is possible with the Dial-A-Bend, an electronic angle-of-bend selector developed by Pines Engineering.

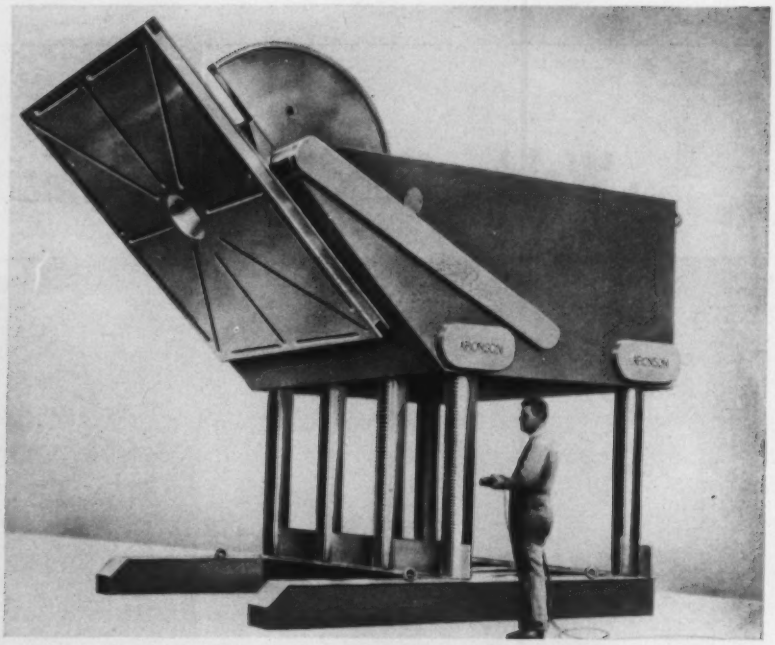
The company says even an untrained operator can program bend angles from blueprint specifications or records from previous setups.

Correction factors including springback are accommodated by setting compensator dials. Then each bend angle is dialed in the normal progressive sequence on the individual angle dials in the panel. Up to ten different angles can be programed on Pines machines, up



to 15 on bending presses. The units are available on most new or in-service machines and presses.

For further information, *write* Pines Engineering Co. Inc., 601 Walnut St., Aurora, Ill.



Welding Positioner Lifts 60 Tons

IN THIS 60 ton welding positioner, the center of gravity of the work is 12 in. above the table and 12 in. offcenter. With 54 in. of geared elevation at 15 in. per minute, the unit will lift a full load at a 90 degree tilt of the table.

All elevator mechanisms (including the posts) are contained inside the chassis with nothing extending above the top of the chassis to obstruct the turning of large weldments. A 30 hp brake-motor drives through six self-locking worm gear drives to elevate the chassis.

Adjustable stop triggers and precision limit switches permit accurate lift setup and prevent the chassis from overriding the posts. A four speed, gearshift transmission permits variable speed table rotation of 0.008 to 0.36 rpm. A 12 in. ID, hollow spindle permits the use of special fixturing through the spindle (air cylinders, weldments with hubs or axles, and the passage of cable or gas hoses for preheating). The 120 in. square table has eight radial and eight periphery slots. The table tilts 135 degrees in 78 seconds from the horizontal position. Tilting is powered by a 20 hp brake-motor. All drives have magnetic braking.

For further information, *write* Aronson Machine Co., Arcade, N. Y.

High Speed Stressed In Computer System

A DIGITAL, multiple computer system (L-3060) performs 2,480,000 operations per second and retrieves information from memory in less than a millionth of a second, says the manufacturer.

The transistorized system has a high speed, core memory access to 144,000 words, random access to 3,250,000 words stored in magnetic disc files, and magnetic tape, storage files of 9 million words. The random access information can be retrieved in 0.017 second and all files are expandable.

The manufacturer says a lower speed system is also available for other applications.

For further information, *write* Librascope Div., General Precision Inc., Glendale, Calif.

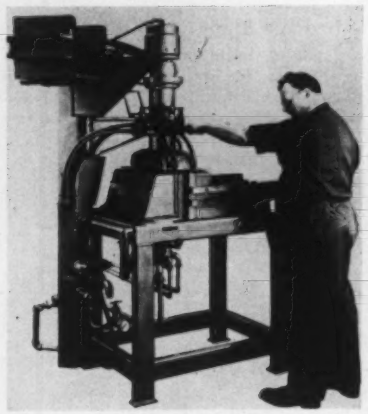
Coremaking Machine Economical on Small Runs

MAXIMUM economy for limited production runs is the claim for a small, furfural coremaking machine (Model FC-12). Only gas and air connections are required. The units are manually operated.

The gas fired, preheat chamber provides for operating temperatures from 400 to 500° F. The blow

head can be swung from the refill to blow position easily and quickly. The carriage frame is opened and closed by a fast acting handwheel. A single, hand controlled, duplex valve controls locking and blow-on and blow-off operations.

Coreboxes can be accommodated in depths from 6 to 16 in., in heights from 3 to 10 in., and in thicknesses from 3 to 6 in. Floor space requirements are 43 x 74 in. Over-all height: 79 in. Units are virtually maintenancefree for all normal limited production runs, says the company.



For further information, *write* SPO Inc., 6494 Grand Division Ave., Cleveland 25, Ohio.

System Permits Precision Plasma Spray Coating

IMPROVEMENTS in control and flow of plasma powders permit duplication of coatings, says Herbert S. Ingham, vice president, Engineering Div., Metco Inc. The company's system has three components: 1. A console with automatic controls including fail-safe devices. 2. A powder feeder that permits exact duplication of coatings. 3. A simplified spray gun with a one piece nozzle and an all-purpose electrode—both in fixed positions to eliminate the need for adjustment.

The company says the system permits flame spray speeds (with most materials) of 5 to 15 lb an hour with a deposit efficiency of 65 to 80 per cent. Tungsten carbide, for example, has a deposit efficiency of 75 per cent.

The gun has six basic parts and a handle that are precision made and interchangeable. The gun is light enough to be operated by hand (3¼ lb), sturdy enough to be machine mounted, and small enough for spraying bores down to 5 in. ID. Nitrogen, argon, or helium can be used as the plasma gas.

The gun has no moving parts and requires no adjustments.

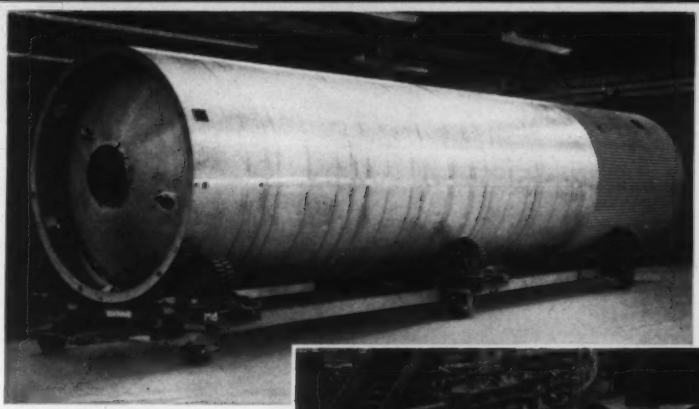
A positive mechanical metering device feeds powder to the gun at a constant rate with high accuracy. A gas stream carries powder to the gun without flutter regardless of the amount of powder in the hopper or the wear on the hopper components.

Coatings can be duplicated. Volume is knob controlled over a wide range of settings.

In general, most inorganic materials that can be melted without decomposition can be applied, says the company.

Development work at Metco is now being done with tantalum, columbium, titanium nitride, chro-

PROFITS are built on DEPENDABILITY



For Steady, Positive, Precision Rotation of THIN-WALLED VESSELS use Aronson TRACTRED® TURNING ROLLS

Shown in the photographs above is a good example of an adaptation of Aronson TRACTRED Turning Rolls. Installed on a specially built dollie they become a portable unit that protects thin walled vessels from wrinkling, marring or indenting while being rotated or transported. Cradled in these rubber TRACTREDS, vessels are handled gently dependably with positive, precision rotation. Profits are built on dependability and dependability is built into every Aronson product.

ARONSON BUILDS THE MOST COMPLETE LINE OF POSITIONERS
. . . WITH CAPACITIES RANGING FROM 25 POUNDS TO 600 TONS

Universal Balance® Positioners • Bench Turntable Positioners • Gear Driven Positioners
Headstock-Tailstock Positioners • TracTred® Turning Rolls • Turntables
Fully Automatic Positioners • Geared Elevation Positioners • Magnetic Welding Clamps

Write for detailed engineering data

Quality PRODUCTS by Aronson MACHINE COMPANY, INC.
ARCADE, NEW YORK

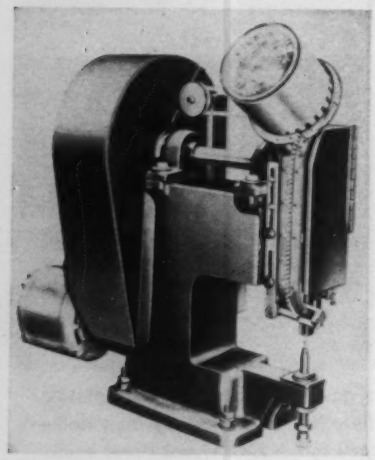
mium monoboride, and with a number of oxides, carbides, and borides.

For further information, *write* Metco Inc., 1101 Prospect Ave., Westbury, N. Y.

Adaptability Stressed in Tubular Riveting Machine

ADAPTABILITY of the Etco 600, tubular riveting machine makes it suitable for the electrical, electronic, and metal fabrication industries, says the maker.

In addition to tubular rivets, the unit can also feed and fasten all makes of eyelets and grommets. No tooling change is required to handle fasteners of varying lengths with the same barrel diameter. Adjustments for length and clinching are made by a simple screw setting of the anvil. Fasteners with different barrel diameters are accommodated by easily interchangeable feed tracks.



The unit is capable of producing a setting force over 3000 ft-lb through its 40 lb flywheel. The flywheel is engaged by a single revolution clutch, operated by an electric foot switch. Circuit design prevents damaging double strokes. Equipment includes motor (1/3 hp, 115 volt, alternating current), tooling, and controls.

For further information, *write* Eyelet Tool Co. Inc., 31 Carleton St., Cambridge 42, Mass.

NEW Literature

Write directly to the company for a copy

Chain Ideas

Presented in a file folder format are design ideas for utilizing chain to reduce production costs and increase production efficiency. The applications shown in 19 mechanical drawings include roller chain used as a slat conveyor, reciprocating drive, feed roll drive, chain roller bearing, external gears, internal gears, and flexible shaft coupling. Dept. DK, Atlas Chain & Mfg. Co., West Pittston, Pa.

Salt Bath Data

Bulletin 200 covers a wide range of salt bath applications including neutral hardening, tempering, austempering-martempering, carburizing, annealing, high speed quenching, and nitriding. Also included are definitions and application functions of neutral, nitrate, and cyanide bearing salts, a bath recommendations guide for SAE steels, and a Fahrenheit to Centigrade conversion table. A. F. Holden Co., 14341 Schaefer Highway, Detroit 27, Mich.

Hydrogen and Steel

The resistance of steels to hydrogen at high pressures in chemical and petrochemical processing is the subject of an article translated from a German technical publication. It traces development of steel resistance to hydrogen under pressure, covers current knowledge, and suggests potentialities. It discusses engineering steels containing various combinations of chromium, molybdenum, nickel, tungsten, vanadium, and other materials. Climax Molybdenum Co., a division of American Metal Climax Inc., 1270 Avenue of the Americas, New York 20, N. Y.

Thread Lubrication

An 8 page reprint (Special Print No. 456) covers the effect of friction in threaded connections and explains how solid lubricants provide uniform bolt tension at low torque readings, and how they eliminate such effects as galling and seizing. Surface geometry of mating threads and the theory of thread lubrication are discussed. Alpha-Molykote Corp., 65 Harvard Ave., Stamford, Conn.

Cemented Carbide Standard

A simplified practice recommendation that lists standard stock items of the cemented carbide industry is entitled "Standard Shapes, Sizes, Grades, and Designations of Cemented Carbide Products." Official government designation is R263-60. The document covers 44 items such as throwaway carbide inserts, saw tips, chisel blanks, die nibs, masonry drills, and twist drill blanks. Cemented Carbide Producers Association, 2130 Keith Bldg., Cleveland 15, Ohio.

Laminated Plastics

Techniques for machining laminated plastics are described in a brochure issued by Synthane Corp. Covered are circular sawing, bandsawing, turning and boring, threading, automatic screw machining, drilling, milling, gear cutting, punching, and machining of hard grade laminates. Tools, speeds, feeds, cooling, and lubrication are detailed. Customer Service, Synthane Corp., Oaks, Pa.

Bolt Damage from Grinding

The effects of metal damage caused by improper grinding of high strength, aircraft fasteners are detailed in a technical report. It also discusses the harmful effects of uncontrolled and undetected grinding stresses or burns on any critical structural metal part. Request "The SPS Emergency Report on Grinding Damage" (Form 2725). Standard Pressed Steel Co., Box 579, Jenkintown, Pa.

Abrasive Blast Cleaning

Included in a 28 page bulletin is a description of conventional and automatic work handling systems for abrasive blast cleaning setups. Ask for Bulletin No. 162-D. Wheelabrator Corp., 1157 S. Byrkit St., Mishawaka, Ind.

Loading and Lifting

Fifty-nine cases are detailed in a bulletin, *Case Studies in Modern LIFT-portation*. Cross references for product and industry are provided. Industrial Lift Div., Globe Hoist Co., E. Mermaid Lane at Queen Street, Philadelphia 18, Pa.

Electrical Contacts

Latest techniques in the use and production of electrical contacts and contact assemblies are described in a bimonthly periodical, *Fansteel Confacts*. It covers electrical contacts made of tungsten, precious metals, and special alloys, and provides case histories. Public Relations Dept, Fansteel Metallurgical Corp., North Chicago, Ill.

Handling of Chemicals

Included in an eight page catalog is a performance chart which rates the comparative wear and chemical resistance of neoprene, neoprene coated, Koroseal coated, and rubber gloves. B. F. Goodrich Industrial Products Co., a division of B. F. Goodrich Co., Akron, Ohio.

Fiberboard Packages

Commonly used methods of bottom closing regular slotted containers and other corrugated boxes are described in a 20 page booklet. Included are simplified and condensed quotations from Uniform Freight Classification No. 3, Rule 41—the basic guide to meeting common carrier shipping requirements. Request Form AD-230. Acme Steel Products Div., Acme Steel Co., 135th Street & Perry Avenue, Chicago 27, Ill.

Research Activities

The annual report of the research activities at Rensselaer Polytechnic Institute is presented in a 56 page brochure. A bibliography of material published or presented during the report year is included. Office of Institute Relations, Rensselaer Polytechnic Institute, Troy, N. Y.

Another NEW Jones & Lamson Optical Comparator
THE ECONOMY MODEL 14″-SCREEN PC-14A

This new 14″-screen universal measuring and comparison machine incorporates lateral, vertical and angle measuring facilities. It offers a combination of important features that set the standard for practicality, price, and performance:

1. All measurements read directly to .0001″ without computation.
2. High-intensity fan-cooled illuminating units for sharp definition of shadow image.
3. No adjustments when changing magnifications. A full range of *J & L Telecentric Projection Lenses* is available, from 5X to 125X.
4. Three table styles are available; a plain table as well as 18″ and 30″ ball or roll type measuring tables.
5. Work capacity — either 5″ or 8″ in diameter with max. of 24″ between centers.

Many other features such as new normal light reflection unit, tracing attachments and super-high-pressure mercury arc illumination, are available.

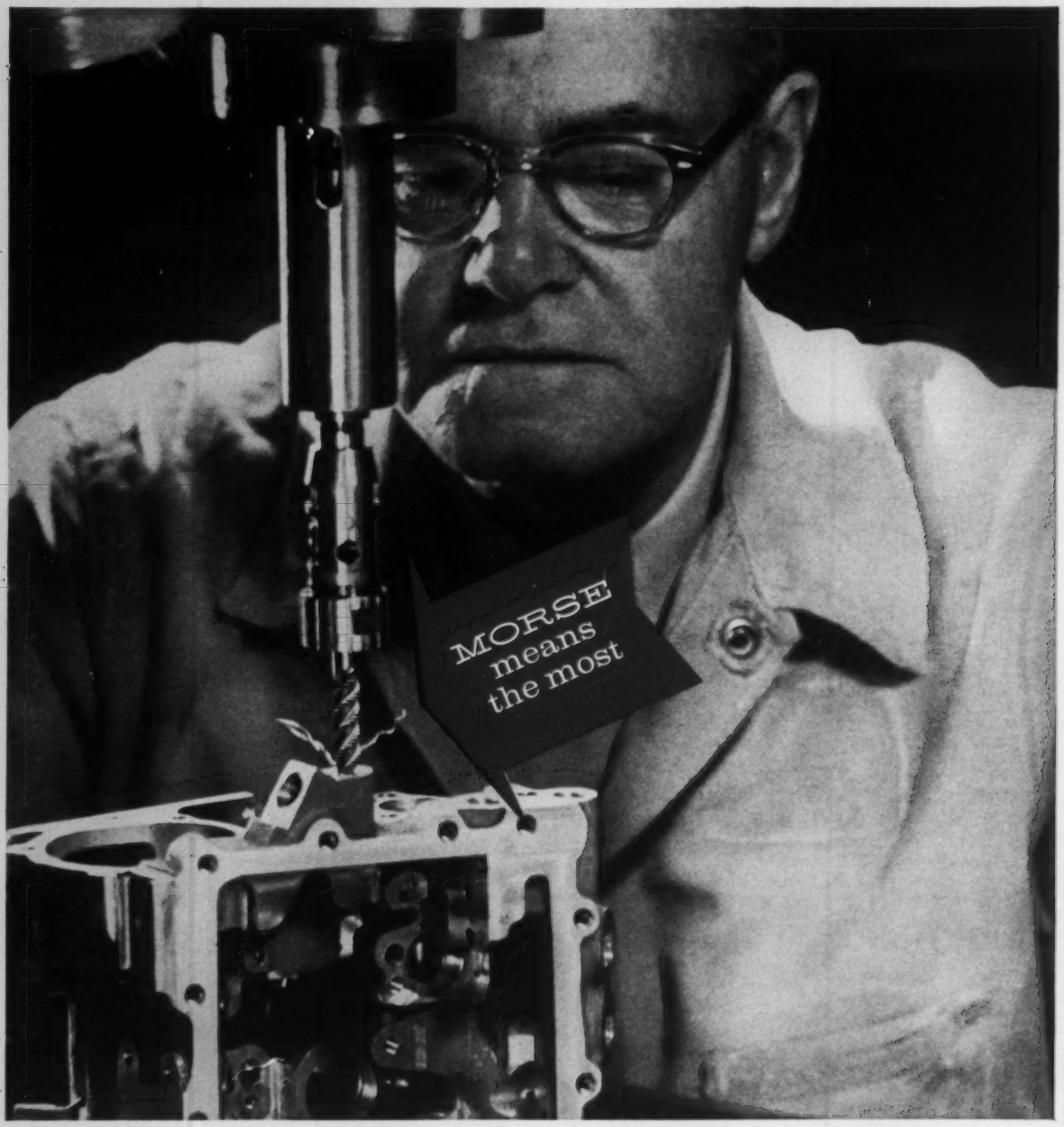
See this machine in action at Booth #308, ASTME Show, Los Angeles. Or call one of our West Coast representatives: Germain Machinery, Los Angeles and Phoenix; Moore Machinery, Berkeley; Perine Machinery & Supply, Seattle; Allied Northwest Machine Tool Corp., Portland and Salt Lake City.

JONES & LAMSON

COMPARATOR DIVISION

Jones & Lamson Machine Company, 517 Clinton Street, Springfield, Vt., U. S. A.

with men who know cutting tools... it's MORSE everytime



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Third Quarter May Top Second

LOOK for third quarter steel production to equal or slightly exceed the 25 million ingot tons poured in the second quarter.

Operations may decline moderately this month because of automotive model changeovers and vacations in other industries, but the drop will be less than seasonal. Although slackening demand may cause a 10 per cent drop in steel shipments, it won't have a comparable impact on production. Reason: Steelmakers will channel part of their output into inventories of semifinished material so that they can stay competitive on deliveries.

OUTLOOK IMPROVING— Although the third quarter will get off to a slow start, July production will probably top the 7.6 million ingot tons that were poured in April, the first month of the second quarter. Steelmakers expect July to be better than originally forecast, thanks to a wave of last minute orders.

UPTURN IN AUGUST— Demand will accelerate next month as automakers start production of their 1962 models and other consumers end their vacations. The sales chief of a major Midwestern mill believes his company will ship as much steel in August as it did in June.

At another large mill, sales executives report that their August orders are the largest they've had in months. Says a market analyst: "We expect our August shipments to be larger than June's."

INVENTORIES MAY RISE— Although users are starting to book tonnage farther ahead, they're not making any effort to increase their inventories. During the first half of the year, they received about 31.5 million tons of finished steel from U. S. mills and foreign suppliers. But they consumed about 33 million tons, so they trimmed their stocks by 1.5 million tons. Almost all of the liquidation took place in the first quarter. Since then, shipments have equaled consumption and inventories have been static. Third quarter consumption is expected to total between 17.5 million and 18 million tons (about the same as the second quarter's). Shipments may exceed consumption slightly if users start hedging against the possibility of an October price increase (see Page 35). They could add about 500,000 tons to their inventories in September.

HIGH LEVEL FORECASTING— Here's what top executives are saying about metalworking's prospects:

- Logan T. Johnston, president, Armco Steel Corp.—Third quarter ingot production will be about 26 million tons and fourth quarter output about 28 million tons. The year's total will approximate 1960's.
- Joseph L. Block, chairman, Inland Steel Co.—Second half ingot production will be between 55 million and 60 million tons, assuming a strong business recovery and some inventory building.
- Louis B. Neumiller, chairman, Caterpillar Tractor Co.—There hasn't been any significant improvement in construction machinery business, but domestic sales may pick up in the second half. Foreign sales may decline.
- Robert S. Ingersoll, president, Borg-Warner Corp.—The upturn for durable goods will be gradual and minimal. There will be modest second half gains for electrical machinery, appliances, and air conditioning.

OPERATIONS HOLD— Look for ingot production in the week ending July 15 to be close to the 1.8 million tons that STEEL estimates the industry poured in the week ended July 8.

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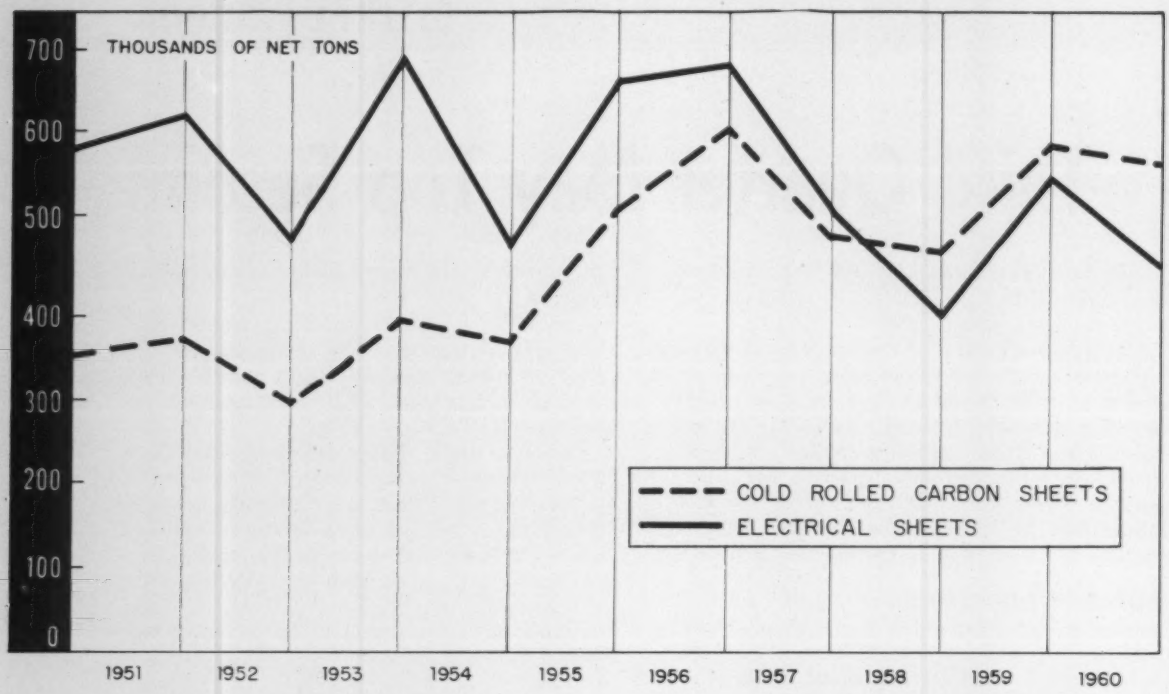
*Current prices were published in the July 3 issue and will appear in subsequent issues.

Electrical Equipment Industry Intake of Carbon vs. Silicon Sheets



Carbon Steel Gains in Electrical Use

SHIPMENTS of cold rolled carbon steel sheets and strip for applications in the electrical machinery and equipment industry have exceeded those of electrical (silicon) grades since 1958. (See chart.)

The electrical machinery industry's tonnage intake of cold rolled carbon grades is 61 per cent higher than it was in 1950. (Much of this is low carbon steel.) Its receipts of electrical steel are down about 20 per cent. (Mill shipment data show that makers of electrical machinery and equipment account for 80 to 90 per cent of electrical steel consumption.)

• **Why**—Increased usage by makers of small motors helps to explain the growing popularity of plain, low carbon grades. Considering price, cost savings can exceed $75 a ton on base price alone. Another factor: Energy loss in most applications of this steel seems to be a secondary consideration. The steel (mainly cold rolled sheets) is used principally in intermittent duty, fractional horsepower motors; in reactors; relays; and intermittent duty transformers.

• **Outlook**—Some market analysts think that the use of plain, low carbon may have reached maximum market penetration in the electrical field—except for periods of emergency and supply shortages. Others believe that the material will continue to make gains so long as it offers attractive cost savings, such as applications where core loss is not a vital factor.

The availability of electrical steel will also be a factor in the use of plain, low carbon. Mill deliveries of electrical sheets average around four weeks, though some producers give prompter service to meet competition. Cold rolled carbon sheet shipments range two to five weeks.

• **History**—Use of plain, low carbon in electrical apparatus is not new. Laminations of the material were used for magnetic circuits prior to the development of silicon steels early this century.

Plain, low carbon usage has gained despite the popularity of special silicon grades developed to meet demand for improved magnetic core materials.

Usage of plain, low carbon in electrical applications was given new impetus during World War II when a steel shortage forced equipment manufacturers to use it as a substitute for silicon steel where they could. The same situation prevailed during the Korean War.

• **Types Used**—Several grades of plain, low carbon are used for electrical duty. They include: Regular, commercial quality cold rolled; full hard, cold rolled (not annealed); rephosphorized; and a

newly developed critically strained grade. A cold rolled rimmed steel, continuously annealed for flatness, is specifically processed for magnetic applications. It contains no silicon, but the producer offers it as an electrical grade steel and claims it is superior magnetically and physically to regular cold rolled.

• **New Grade**—Cold rolled, sheets used for laminations in electrical apparatus are offered with secondary cold reduction of a substantial amount beyond the usual temper rolling. Reason: To induce a stressed condition. The sheets are produced with a surface finish to minimize sticking of the laminations during the user's annealing operation.

Leading makers of sheets recently revised their extra cards on cold rolled sheets to include a new stressing charge (70 and 90 cents per 100 pounds, depending on gage). It applies when substantial or critical stressing is required.

The switch from power generators to power alternators in the auto industry is said to present a growing market for the product. Last year, the industry took 6037 tons of electrical sheets and strip vs. 12,440 tons in 1950.

Electrical grades of steel are low carbon, silicon bearing (up to 5 per cent) killed steels produced and processed to develop certain magnetic properties. Except for iron and varying amounts of silicon, they generally contain little more than residual amounts of other elements, and they are indispensable where magnetic properties required are more exacting than those provided by plain, low carbon. Numerous types and classes are produced for applications in the construction of electrical equipment.

• **Constantly Improved**—The electrical characteristics of the silicon steels (generally divided into two broad classifications, grain oriented and nonoriented) have been steadily improved through more efficient production, processing, and heat treating practice. Special practices are employed during melting and pouring to insure a homogeneous product. Also, the steelmakers improve their product through hot topping, controlled heating and rolling, controlled cooling, special surface preparation, and inspection procedures.

By closely controlling the content of elements in the steel, including reduction of carbon to desired levels, a better product for electrical applications is made possible. The magnetic properties of the silicon steels are improved by the lowering of carbon content. And when almost all the carbon is removed from plain carbon steel, the resulting metal is suitable as a replacement for nonoriented low silicon steel (1 per cent) in many applications.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 104 & 107

July sheet business is shaping up better than most producers had expected. Shipments are off, but the slump is less sharp than had been predicted. It's now thought some consumers are taking in tonnage for stockpiles. In any case, August will be a much more active month than July. It's expected the auto plants, now concluding their 1961 model runs, will begin active specifying of new steel tonnage for the 1962 model runs. Assemblies are scheduled to begin next month. Auto needs will have considerable bearing on sheet market activity in the next few weeks.

Galvanized sheets are in the strongest demand of all the major steel products. Some concern, however, is being shown in some quarters. Drought in the Western plain states is beginning to put a dent in steel demand. One grain bin maker has notified his galvanized sheet suppliers that prospects of crop losses due to drought are reducing farmers' needs for storage bins.

Bethlehem Steel Co. will begin construction of a galvanizing mill at Lackawanna, N. Y., about Sept. 1. It's estimated that it will cost about $40 million.

Wire . . .

Wire Prices, Pages 107 & 108

Availability of imported steel is causing producers of finished goods fabricated from wire to put price pressure on sellers of drawn wire and rods. One maker of screws in the East is operating almost entirely with imported rods or wire.

While demand is light, foreign steel competition is expected to intensify in this half of the year, particularly in the medium and higher carbon grades.

Stainless Steel Prices Raised as Nickel Goes Up

Crucible Steel Co. of America, Pittsburgh, increased the base prices of all nickel bearing stainless steels, effective July 5. The action is attributed to an increase of about 10 per cent in the price of nickel announced June 30 by International Nickel Co. The new prices do not compensate for other factors, such as the three wage increases that have been absorbed since 1958, Crucible stated.

The following increases are typical: Types 201 and 202, 0.5 cent a pound; 301, 0.75 cent; 302, 304, and 304L, 1 cent; 316, 321, and 347, 1.25 cents; 310, 2.25 cents.

Stainless Steel . . .

Stainless Steel Prices, Page 109

Washington Steel Corp., Washington, Pa., is offering bright annealed stainless sheets in all grades it produces; first deliveries are scheduled in August.

These extras will apply on widths 24 in. up to (and including) 48 in.:

Gage	Cents Per Lb	Gage	Cents Per Lb
14	3.25	22	6.50
15	3.50	23	7.50
16	3.50	24	8.25
17	4.25	25	9.50
18	4.25	26	11.00
19	5.50	27	12.00
20	5.75	28	13.25
21	6.00		

A new type of stainless steel—Kromarc 55—is available from Westinghouse Electric Corp., Pittsburgh. The firm says it can be used in parts for elevated temperature service, particularly in steam turbines where large sections and large diameter, thin walled pipe are welded together. It can be used in the weld rod as well as in the cast or rolled sections being joined, and is suitable for joining other austenitic steels, such as AISI Type 316, says Westinghouse.

In composition, the new alloy combines a 100 per cent austenitic alloy with high ductility, crack resistant welds and crackfree base metal. The fully austenitic weld deposit eliminates the need for post-weld heat treatment. The Kromarc stainless steel contains 16 per cent chromium, 20 per cent nickel, sig-

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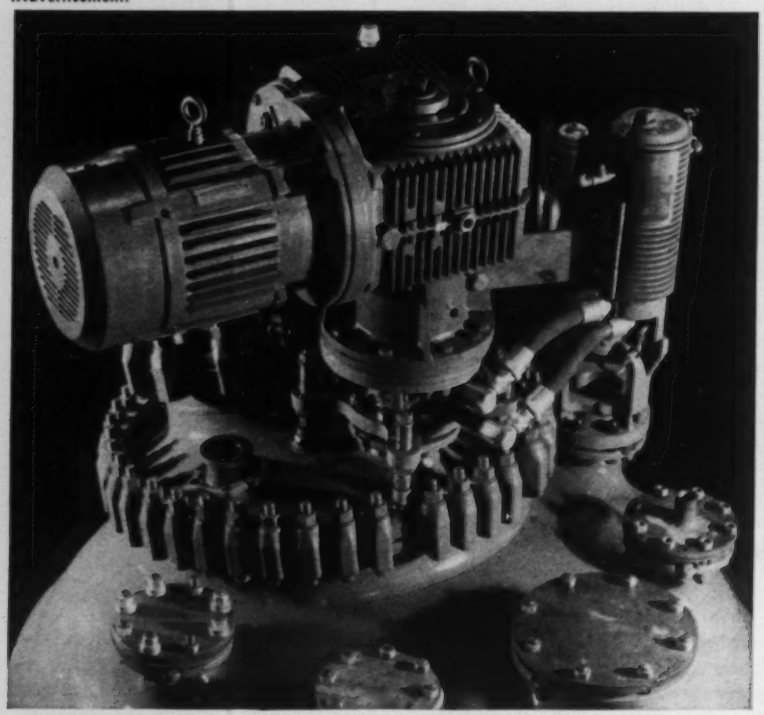


ROCHESTER, N. Y.—The Pfaudler Co. reports space savings and reduced maintenance on their new line of TW Agitation Drives for glassed-steel and alloy mixing vessels due to vertical hollow-shaft double-enveloping worm gear reducers by Cone-Drive Gears, Division Michigan Tool Co., 7171 E. McNichols, Detroit 12, Michigan.

nificant amounts of manganese and molybdenum, and smaller amounts of silicon, carbon, and other impurities, in addition to iron.

New Firm Will Produce Reinforcing Steel Bars

Kankakee Electric Steel Co. will build a $2.5 million electric steel plant in Kankakee, Ill. Annual capacity will be 68,000 tons of reinforcing bars. It will have two Whiting Hydro-Arc, electric furnaces and equipment for rolling bars from ⅜ to 1.25 in. in diameter.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 104

Buyers of concrete reinforcing bars in New England hold the whip hand over prices. In most cases, their estimates for bars in place are unchanged at 12.00 cents to 13.00 cents a pound. For some time, the margin between the estimated cost of bars and the prices actually paid for the material has been wide.

Steel Bars . . .

Bar Prices, Page 103

Vacation suspensions at metalworking plants are reflected in a slowdown in steel bar demand. Barmakers are anticipating an increase in shipments late this month or early in August.

Except for spasmodic buying by government shops where retooling is necessary, machine tool orders are light. That's also the case for textile mill equipment builders.

Some bar tonnage is on mill books for shipment through August and September as a protective measure against possible extension of deliveries in the fourth quarter. Fastener makers and producers of cold drawn bars are buying hot stock on a restricted basis.

Tubular Goods . . .

Tubular Goods Prices, Page 109

The U. S. and Canada had 1942 rotary oil drilling rigs in operation in the latest weekly survey by Hughes Tool Co. That was a decrease of 24 from the 1961 peak reported in the previous weekly report. The U. S. was operating 1773 rigs, down 29, and Canada 169, up five.

Service centers at several points

are moving substantial tonnages of pipe to the construction industries. In the Los Angeles area, it's reported a shortage of imported pipe is stimulating interest in domestic material.

Magnolia Pipeline Co., Portland, Oreg., a subsidiary of Socony Mobil Oil Co., Shell Oil Co., and Texaco Inc., will build a 324 mile petroleum products pipe line from the Puget Sound area of Washington to Portland, Oreg. It will cost $17.5 million.

Plates . . .

Plate Prices, Page 103

Plate demand is being sustained principally by tank and boiler work, with chemical industry requirements holding up particularly well. Ship and railroad needs continue disappointing. Little forward buying is being done. One of the large electrical companies is endeavoring to reduce inventories of light plates from 45 to 30 days.

While railroad car needs are at low ebb, some pickup is expected this fall. Shipyard tonnage may be heavier in August and September. Fourth quarter Naval plate volume is expected to be up.

Wheeling Steel Corp., Wheeling, W. Va., has gone into commercial production of heavy duty, industrial flooring materials at its Beech Bottom (W. Va.) plant. The product, Ancor rolled steel floor plates, was made for a short time at the company's former Ackerman plant in Wheeling.

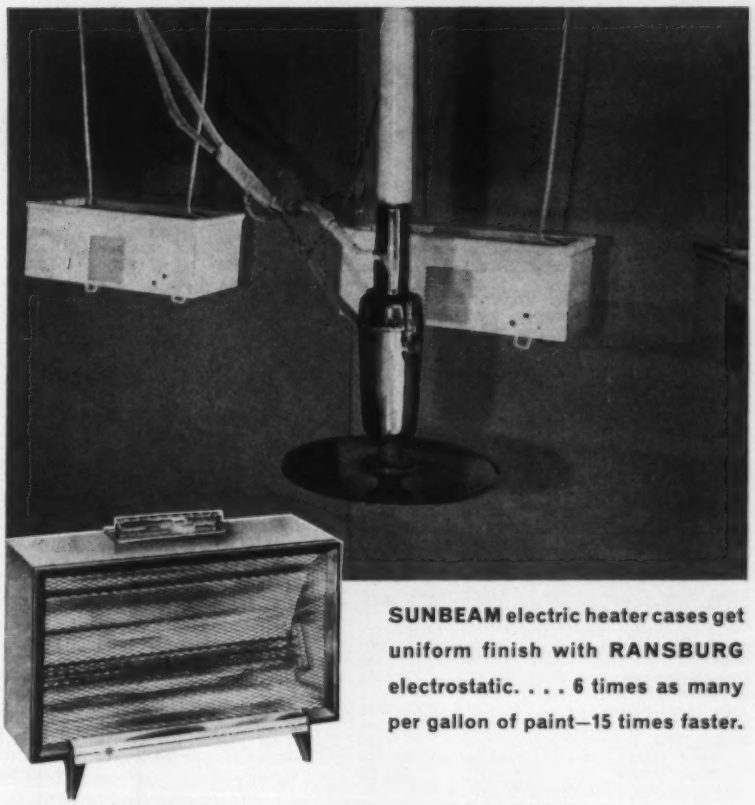
Rails, Cars . . .

Track Material Prices, Page 108

A $5 million order for 400, refrigerator piggyback trailers has been placed with the Fruehauf Trailer Co. by the Pacific Fruit Express, San Francisco, jointly owned by the Southern Pacific and the Union Pacific railroads.

Distributors . . .

Operators of service centers handling stainless steel sheets are expected to meet any price competition that develops within their marketing areas. Within the last ten days, a leading distributor cut his prices below the mill level; other distributors are expected to take similar action when necessary.



SUNBEAM electric heater cases get uniform finish with RANSBURG electrostatic. . . . 6 times as many per gallon of paint—15 times faster.

"Paint Mileage Leaps 500%.... Production Upped 15 Times" Reports ENAMELED STEEL & SIGN CO.

Curt Simmons, President, ENAMELED STEEL & SIGN COMPANY of Chicago, describes results with RANSBURG Automatic No. 2 Process Electro-Spray: "We first painted cases for the new SUNBEAM portable electric heaters with air hand spray at the rate of 200 pieces per day using 6 gallons of paint. Now, with RANSBURG electrostatic we've increased production 1400% to 3000 pieces daily with only 15 gallons of paint." An increase of 500% in paint mileage! *What would savings like this mean in your finishing department?*

QUALITY IMPROVED WITH RANSBURG ELECTRO-SPRAY

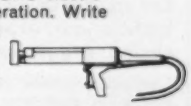
Sags and runs, a problem with the air hand spray, have been eliminated with the automatic electrostatic equipment. Mr. Simmons adds: "Now we achieve a uniformity over the configurated area which wasn't always possible before. We know the 50,000th piece will turn out the same as the first."

ENAMELED STEEL—sold on the efficiency and versatility of RANSBURG Electro-Spray—uses 14 automatic No. 2 Process units to meet the heavy demands of their diversified, high volume production.

NO REASON WHY YOU CAN'T DO IT TOO

Manufacturers—large and small—are reporting similar savings in paint and labor with increased production. If your volume doesn't justify automatic electrostatic equipment, perhaps the RANSBURG electrostatic hand gun will help cut costs in your finishing operation. Write for our new brochure showing actual in-plant production photos, savings figures and detailed information on RANSBURG No. 2 Process Electro-Spray.

RANSBURG



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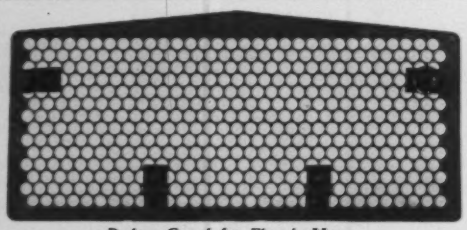
Shipments of Finished Steel Products — April, 1961

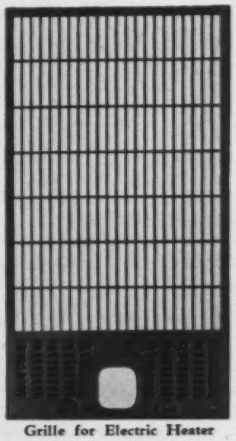
(Net tons; all grades)

Products	April, 1961 Carbon	April, 1961 Alloy	April, 1961 Stainless	First Four Months 1961	First Four Months 1960
Ingots, etc.	9,138	8,606	449	70,918	159,793
Blooms, etc.	49,770	27,362	2,442	313,787	697,770
Tube Rounds	878	367	27	4,902	8,875
Skelp	2,623	.....	.....	46,144	66,750
Wire Rods	66,901	1,418	765	261,975	444,471
Structurals	342,514	2,414	.....	1,296,643	2,113,705
Steel Piling	32,515	.....	.....	92,665	160,104
Plates	423,717	31,220	3,359	1,721,239	2,866,939
Rails-Standard	44,380	.....	.....	155,711	345,459
Rails-Other	3,328	1,144	.....	17,374	20,761
Joint Bars	1,852	.....	.....	5,635	12,506
Tie Plates	9,858	.....	.....	26,079	59,136
Track Spikes	3,786	.....	.....	10,918	19,332
Wheels	13,859	103	.....	53,856	99,857
Axles	4,418	.....	.....	19,158	51,605
Bars-HR	368,918	97,243	3,454	1,781,624	3,278,632
Bars-Reinforcing	236,587	.....	.....	707,859	633,312
Bars-CF	70,854	12,668	4,526	341,391	657,439
Tool Steel	497	5,490	.....	24,415	38,307
Standard Pipe	169,679	208	.....	614,671	921,938
Oil Country Pipe	87,741	21,712	.....	428,427	598,945
Line Pipe	211,535	76	.....	708,386	1,001,189
Mech. Tubing	39,617	13,682	568	192,110	354,829
Pressure Tubing	15,261	4,019	1,468	81,633	98,930
Wire-Drawn	194,354	2,711	1,847	696,942	989,456
Nails & Staples	31,636	.....	1	107,345	127,600
Barbed Wire	9,452	.....	.....	27,874	18,395
Woven Fence	17,284	.....	.....	52,432	45,906
Bale Ties, etc.	8,717	.....	.....	18,022	17,829
Black Plate	44,682	.....	.....	172,132	226,082
Tin Plate-HD	23,878	.....	.....	96,067	137,068
Tin Plate-Electro	455,116	.....	.....	1,822,774	1,945,256
Sheets-HR	506,447	12,190	1,267	1,943,063	3,644,971
Sheets-CR	871,166	3,169	10,832	3,343,499	6,027,933
Sheets-Galvanized	257,673	44	.....	904,119	1,237,634
Sheets-Coated	15,173	.....	.....	62,263	108,497
Elec. Sheets-Strip	1,496	40,504	.....	167,138	254,183
Strip-HR	79,306	1,203	263	318,235	605,721
Strip-CR	73,858	1,223	12,962	350,936	600,721
Total (1961)	4,800,464	288,776	44,230	19,060,361	.....
Total (1960)	6,302,126	394,255	45,428	.....	30,697,189

Data from American Iron & Steel Institute.



Rodent Guard for Electric Motor



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Ordinarily, distributors sell stainless at the same price level as the mills, operating under a 10 per cent functional discount from the mills.

The recent 10 per cent increase in nickel prices (June 30) may firm up the stainless sheet market. One producer immediately raised his prices 1 to 2 per cent to reflect the nickel increase.

New Developments Assure Bright Outlook for Steel

The North American steel industry is assured a bright future through new merchandising techniques, new products, and improved methods of doing business. That's what Robert G. Welch, executive vice president, Steel Service Center Institute, told the Business Outlook Conference of the U. S. Chamber of Commerce.

He reviewed developments undertaken by the steel companies, among them the new emphasis on merchandising and marketing, the sales training programs, stepped-up market research activities, newly designed end products that hold promise of expanding markets, and recent industry-wide promotions of all steel products.

He predicted that many new markets would open. Several new ones already offer particular promise, noticeably heavy construction, he noted.

Drill Rod Is Offered As Packaged Commodity

Firth Sterling Inc., Pittsburgh, is introducing a new marketing approach on polished drill rod: It's prepackaged and priced by the piece. Starting July 1, the product was made available to users in four grades. It is packaged in boxes and cylinders, which facilitate stocking and handling while protecting the material from dirt and rust.

Pig Iron . . .

Pig Iron Prices, Page 110

No significant change is in prospect for the merchant pig iron market during the next several weeks. Vacation shutdowns at foundries are restricting new business and curtailing shipments.

Republic Steel Corp. will begin

shipping 300 to 400 tons of molten iron daily from its Youngstown blast furnaces to the Valley Mould & Iron Corp.'s Hubbard, Ohio, plant when it resumes operations following a vacation shutdown. For that reason, Republic Steel Corp. blew in a second blast furnace at its Youngstown plant.

Dow Now Operating Two Aluminum Sheet Mills

Two rolling mills of the Dow Metal Products Co., division of Dow Chemical Co., Midland, Mich., are producing aluminum sheet. A four high, 68 in. sheet mill recently was put into operation at Dow's Madison (Ill.) plant. The mill is fed by an 84 in., reversing, hot breakdown mill. These facilities complement aluminum sheet production at Dow's Jackson (Mich.) plant.

Reroll stock and coil sheet in relatively thick gages are the Madison plant's initial aluminum sheet products. Others will be added. The Jackson plant specializes in aluminum coil and flat sheet in the thinner gages.

The Dow company entered the aluminum sheet market in July, 1960, when it took an option to buy the facilities of Sheet Aluminum Corp. in Jackson. The purchase was completed in January, 1961.

Independence Day Holiday Cuts Steel Ingot Output

OBSERVANCE of Independence Day forced a curtailment in steel production to an estimated 1,800,000 tons for the week ended July 8. That was the smallest tonnage produced since the week ended Apr. 22 and marked the sixth consecutive weekly decline in operations. Steelmakers think a reversal of the trend is imminent.

• **Youngstown**—Steel ingot production dropped 5 points to about 45 per cent of 1960 capacity during the week ended July 8. However, several plants which usually suspend basic steelmaking on July 4 worked through the holiday.

• **Buffalo** — Ingot production here showed only a slight drop during the week ended July 8, due primarily to the suspension of operations over the holiday by one mill.

• **Chicago** — The steelmaking rate showed little effect of the Fourth of July holiday. Operations held fairly close to the preceding week's rate of 76 per cent of 1960 capacity.

• **Wheeling, W. Va.**—Several major departments at Wheeling Steel Corp.'s Steubenville and Martins Ferry, Ohio, plants operated on Independence Day.

• **Detroit** — Ingot production declined here during the week ended July 8. Jones & Laughlin Steel Corp. shut down operations for two weeks. McLouth Steel Corp. and Great Lakes Steel Corp. curtailed production on Independence Day. Ford Motor Co. scheduled operations at about 80 per cent of 1960 capacity.

• **Birmingham** — The steelmaking rate for this district is estimated at 74 per cent of 1960 capacity for the week ended July 8. One producer cut operations slightly because of an inventory accumulation.

• **Cincinnati** — Production of steel ingots increased here during the week ended July 8. Primary reason: An increase of 2000 tons by one major district producer. The estimated rate is about 74.2 per cent of 1960 capacity.

• **San Francisco**—Most open hearth departments of mills in the Western district worked through the July 4 holiday, but at a reduced rate.

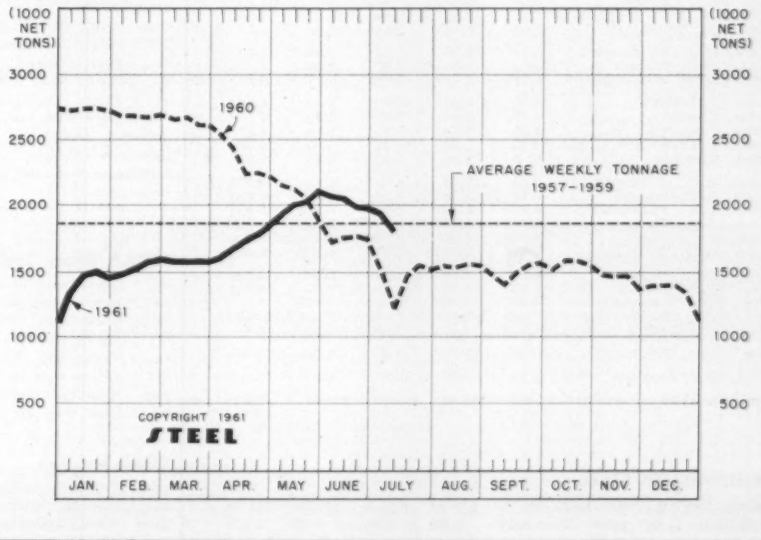
• **Cleveland**—Ingot production declined slightly during the week ended July 8. A quick recovery is expected over the balance of the month.

STEEL INGOT PRODUCTION

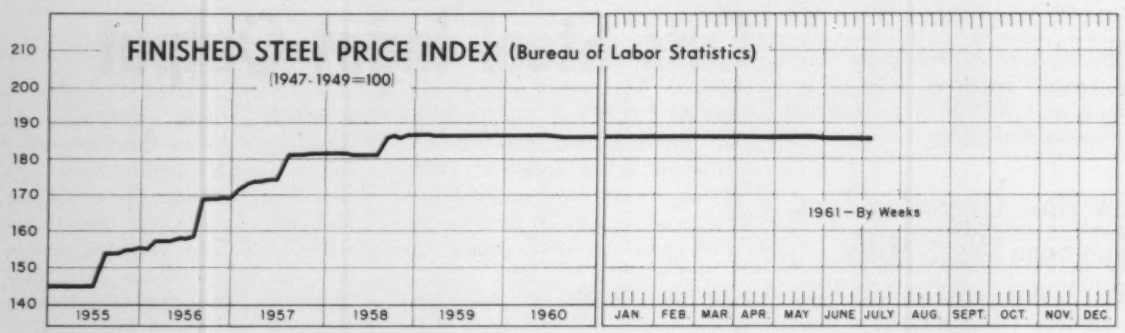
Weeks Ended	Net Tons	Change
July 8	1,800,000*	— 5.2%
July 1	1,925,000	— 2.7%
June 24	1,978,000	—0.4%
Totals to July 1		
1961	45,071,000	—25.4%
1960	60,386,000	

DISTRICTS	Week Ended July 1 Tons‡	Week Ended July 1 Index†	Week Ended June 24 Index†
Northeastern	272,540	102	101
Buffalo	81,778	84	84
Pittsburgh	347,052	86	93
Youngstown	152,983	90	89
Cleveland	112,966	122	123
Detroit	138,490	132	134
Chicago	430,187	115	114
Cincinnati	80,683	107	118
St. Louis	45,719	87	120
Southern	122,487	113	117
Western	140,296	120	122
Industry	1,925,000	103.3	106.2

*Estimated by STEEL.
†1957-59 (1,862,933 tons) = 100.
‡District tonnages are approximate and will not necessarily add to the national total.



Price Indexes and Composites



July 3, 1961	Week Ago	Month Ago	June Index	Year Ago
185.4	185.4	185.6	185.5	186.2

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended July 3

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825
Rails, Light, 40 lb	7.292
Tie Plates	6.875
Axles, Railway	10.175
Wheels, Freight Car, 33 in. (per wheel)	62.000
Plates, Carbon	6.350
Structural Shapes	6.167
Bars, Tool Steel, Carbon (lb)	0.560
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895
Bars, H.R., Alloy	10.775
Bars, H.R., Stainless, 303 (lb)	0.543
Bars, H.R., Carbon	6.675
Bars, Reinforcing	(N.A.)
Bars, C.F., Carbon	10.710
Bars, C.F., Alloy	14.125
Bars, C.F., Stainless, 302 (lb)	0.570
Sheets, H.R., Carbon	6.350
Sheets, C.R., Carbon	7.300
Sheets, Galvanized	8.775
Sheets, C.R., Stainless, 302 (lb)	0.643
Sheets, Electrical	12.625
Strip, C.R., Carbon	9.225
Strip, C.R., Stainless, 430 (lb)	0.460
Strip, H.R., Carbon	6.250
Pipe, Black, Buttweld (100 ft)	19.495
Pipe, Galv., Buttweld (100 ft)	23.098
Pipe Line (100 ft)	195.430
Casing, Oil Well, Carbon (100 ft)	193.032
Casing, Oil Well, Alloy (100 ft)	302.603
Tubes, Boiler (100 ft)	51.200
Tubing, Mechanical, Carbon (100 ft)	27.005
Tubing, Mechanical, Stainless, 304 (100 ft)	194.268
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
Black Plate, Canmaking Quality (95 lb base box)	7.900
Wire, Drawn, Carbon	10.575
Wire, Drawn, Stainless, 430 (lb)	0.665
Bale Ties (Bundles)	7.647
Nails, Wire, 8d Common	9.433
Wire, Barbed (80-rod spool)	8.372
Woven Wire Fence (20-rod roll)	20.910

STEEL's FINISHED STEEL PRICE INDEX

	July 5 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg = 100)	247.82	247.82	247.82	247.82	210.45
Index in cents per lb	6.713	6.713	6.713	6.713	5.701

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$129.18
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	60.56
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	59.80
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	61.27
Steelmaking Scrap, GT	36.67	37.00	38.50	31.33	45.83

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	July 5 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.65
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.65
Bars, H.R., deld., Philadelphia	5.98	5.98	5.98	5.975	4.93
Bars, C.R., Pittsburgh	7.65	7.65	7.65	7.65	6.25
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.60
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.60
Shapes, deld., Philadelphia	5.745	5.745	5.745	5.77	5.00
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.50
Plates, Chicago	5.30	5.30	5.30	5.30	4.50
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.80
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.50
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	5.35
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.325-5.425
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.85
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.25
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.25-6.35
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.35
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	6.60
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	7.60
Tin Plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.85

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$84.50
Wire rods, ½-⅝" Pitts.	6.40	6.40	6.40	6.40	5.375

PIG IRON, Gross Ton	July 5 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$62.25
Basic, Valley	66.00	66.00	66.00	66.00	60.00
Basic, deld., Philadelphia	70.18	70.18	70.18	70.41	63.76
No. 2 Fdry, Neville Island, Pa.	66.50	66.50	66.50	66.50	63.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	60.50
No. 2 Fdry, deld., Phila.	70.68	70.68	70.68	70.91	64.26
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	57.00
No. 2 Fdry (Birm.), deld., Cin.	70.20	70.20	70.20	70.20	62.70
Malleable, Valley	66.50	66.50	66.50	66.50	60.50
Malleable, Chicago	66.50	66.50	66.50	66.50	60.50
Ferromanganese, net tons†	245.00	245.00	245.00	245.00	215.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$35.50	$36.50	$37.50	$30.50	$44.50
No. 1 Heavy Melt, E. Pa.	39.00	39.00	39.50	34.00	47.00
No. 1 Heavy Melt, Chicago	35.50	35.50	38.50	26.50	46.00
No. 1 Heavy Melt, Valley	38.50	38.50	38.50	32.50	44.50
No. 1 Heavy Melt, Cleve.	35.50	35.50	35.50	31.50	42.50
No. 1 Heavy Melt, Buffalo	31.50	31.50	31.50	30.50	42.50
Rails, Rerolling, Chicago	58.50	58.50	58.50	49.50	66.50
No. 1 Cast, Chicago	41.50	41.50	43.50	40.50	45.50

COKE, Net Ton					
Beehive, Furn., Connisvl.	$15.00	$15.00	$15.00	$15.00	$14.125
Beehive, Fdry., Connisvl.	18.25	18.25	18.25	18.25	16.50
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	27.50

Steel Prices

Mill prices as reported to STEEL, July 5, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 104; footnotes, page 108.

SEMIFINISHED

INGOTS, Carbon Forging (NT)

Munhall,Pa. U5 .....$76.00

INGOT, Alloy (NT)

Detroit S41 .....$82.00
Economy,Pa. B14 .....82.00
Farrell,Pa. S3 .....82.00
Lowellville,O. S3 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
Sharon,Pa. S3 .....82.00

BILLETS, BLOOMS & SLABS Carbon Rolling (NT)

Bartonville,Ill. K4 ....$82.00
Bessemer,Pa. U5 .....80.00
Buffalo R2 .....80.00
Clairton,Pa. U5 .....80.00
Ensley,Ala. T2 .....80.00
Fairfield,Ala. T2 .....80.00
Fontana,Calif. K1 .....90.50
Gary,Ind. U5 .....80.00
Johnstown,Pa. B2 .....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall,Pa. U5 .....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 .....80.00
Youngstown R2 .....80.00

Carbon, Forging (NT)

Bessemer,Pa. U5 .....$99.50
Buffalo R2 .....99.50
Canton,O. R2 .....102.00
Clairton,Pa. U5 .....99.50
Conshohocken,Pa. A3 ..99.50
Ensley,Ala. T2 .....99.50
Fairfield,Ala. T2 .....99.50
Farrell,Pa. S3 .....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 .....99.50
Geneva,Utah C11 .....99.50
Houston S5 .....104.50
Johnstown,Pa. B2 .....99.50
Lackawanna,N.Y. B2 ..99.50
LosAngeles B3 .....109.00
Midland,Pa. C18 .....99.50
Munhall,Pa. U5 .....99.50
Owensboro,Ky. C8 ....99.50
Seattle B3 .....109.00
Sharon,Pa. S3 .....99.50
S.Chicago R2, U5, W14..99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ....109.00
Warren,O. C17 .....99.50

Alloy, Forging (NT)

Bethlehem,Pa. B2 ...$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 .....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3..121.00
Detroit S41 .....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 .....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 .....119.00
Houston S5 .....124.00
Ind.Harbor,Ind. Y1 ..119.00
Johnstown,Pa B2 ....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 .....139.00
Lowellville,O. S3 .....119.00
Massillon,O. R2 .....119.00
Midland,Pa. C18 .....119.00
Munhall,Pa. U5 .....119.00
Owensboro,Ky. G8 ....119.00
Seattle(6) B3 .....140.00
Sharon,Pa. S3 .....119.00
S.Chicago R2,U5,W14 .119.00
S.Duquesne,Pa. U5 ...119.00
Struthers,O. Y1 .....119.00
Warren,O. C17 .....119.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 .....$122.50
Canton,O. R2 .....125.00
Cleveland R2 .....122.50
Gary,Ind. U5 .....122.50
S.Chicago,Ill. R2,W14.122.50
S.Duquesne,Pa. U5 ...122.50
Warren,O. C17 .....122.50

SKELP

Aliquippa,Pa. J5 .....5.05
Benwood,W.Va. W10 ...5.05
Ind.Harbor,Ind. Y1 ....5.05
Munhall,Pa. U5 .....5.05
Pittsburgh J5 .....5.05
Warren,O. R2 .....5.05
Youngstown R2, U5 ....5.05

WIRE RODS

AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 .....6.40
Alton,Ill. L1 .....6.60
Bartonville,Ill. K4 .....6.50
Buffalo W12 .....6.40
Cleveland A7 .....6.40
Donora,Pa. A7 .....6.40
Fairfield,Ala. T2 .....6.40
Houston S5 .....6.65
IndianaHarbor,Ind. Y1 ..6.40
Johnstown,Pa. B2 .....6.40
Joliet,Ill. A7 .....6.40
KansasCity,Mo. S5 .....6.65
Kokomo,Ind. C16 .....6.50
LosAngeles B3 .....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 .....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 .....6.40
Roebling,N.J. R5 .....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 .....6.50
Struthers,O. Y1 .....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes

AlabamaCity,Ala. R2 ...5.50
Aliquippa,Pa. J5 .....5.50
Atlanta A11 .....5.70
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa. B2 .....5.55
Birmingham C15 .....5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.30
Gary,Ind. U5 .....5.50
Geneva,Utah C11 .....5.50
Houston S5 .....5.60
Ind.Harbor,Ind. I-2, Y1.5.50
Johnstown,Pa. B2 .....5.55
Joliet,Ill. P22 .....5.50
KansasCity,Mo. S5 .....5.60
Lackawanna,N.Y. B2 ...5.55
LosAngeles B3 .....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 .....5.50
Niles,Calif. P1 .....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 .....6.25
Seattle B3 .....6.25
S.Chicago,Ill. U5, W14 .5.50
S.SanFrancisco B3 .....6.15
Sterling,Ill. N15 .....5.50
Struthers,O. Y1 .....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 .....5.50

Wide Flange

Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.50
Fontana,Calif. K1 .....6.45
IndianaHarbor,Ind. I-2 .5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 .....5.50
Sterling,Ill. N5 .....5.50
Weirton,W.Va. W6 .....5.50

Alloy Std. Shapes

Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....6.90
Munhall,Pa. U5 .....6.80
S.Chicago,Ill. U5, W14 ..6.80

H.S., L.A., Std. Shapes

Aliquippa,Pa. J5 .....8.05
Bessemer,Ala. T2 .....8.05
Bethlehem,Pa. B2 .....8.10
Clairton,Pa. U5 .....8.05
Fairfield,Ala. T2 .....8.05
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....8.05
Geneva,Utah C11 .....8.05
Houston S5 .....8.15
Ind.Harbor,Ind. I-2, Y1 .8.05
Johnstown,Pa. B2 .....8.10
KansasCity,Mo. S5 .....8.15
Lackawanna,N.Y. B2 ...8.10
LosAngeles B3 .....8.75
Munhall,Pa. U5 .....8.05
Phoenixville,Pa. P4 ....8.10
Seattle B3 .....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 .....8.70
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....8.05

H.S., L.A., Wide Flange

Bethlehem,Pa. B2 .....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ...8.10
Munhall,Pa. U5 .....8.05
S.Chicago,Ill. U5 .....8.05
Sterling,Ill. N15 .....7.75

PILING

BEARING PILES

Bethlehem,Pa. B2 .....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ...5.55
Munhall,Pa. U5 .....5.50
S.Chicago,Ill. I-2, U5 ...5.50

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 .....6.50
Lackawanna,N.Y. B2 ..6.50
Munhall,Pa. U5 .....6.50
S.Chicago,Ill. I-2, U5 ...6.50
Weirton,W.Va. W6 .....6.50

PLATES

PLATES, Carbon Steel

AlabamaCity,Ala. R2 ...5.30
Aliquippa,Pa. J5 .....5.30
Ashland,Ky.(15) A10 ...5.30
Atlanta A11 .....5.50
Bessemer,Ala. T2 .....5.30
Clairton,Pa. U5 .....5.30
Claymont,Del. P4 .....5.30
Cleveland J5, R2 .....5.30
Coatesville,Pa. L7 .....5.30
Conshohocken,Pa. A3 ...5.30
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.30
Farrell,Pa. S3 .....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 .....5.30
Geneva,Utah C11 .....5.30
GraniteCity,Ill. G4 .....5.40
Houston S5 .....5.40
Ind.Harbor,Ind. I-2, Y1.5.30
Johnstown,Pa. B2 .....5.30
Lackawanna,N.Y. B2 ...5.30
Mansfield,O. E6 .....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 .....5.30
Newport,Ky. A2 .....5.30
Pittsburgh J5 .....5.30
Riverdale,Ill. A1 .....5.30
Seattle B2 .....6.20
Sharon,Pa. S3 .....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 .....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 .....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 .....5.30

PLATES, Carbon Abras. Resist.

Claymont,Del. P4 .....7.05
Fontana,Calif. K1 .....7.85
Geneva,Utah C11 .....7.66
Houston S5 .....7.15
Johnstown,Pa. B2 .....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron

Economy,Pa. B14 .....14.10

PLATES, H.S., L.A.

Aliquippa,Pa. J5 .....7.95
Ashland,Ky. A10 .....7.95
Bessemer,Ala. T2 .....7.95
Clairton,Pa. U5 .....7.95
Claymont,Del. P4 .....7.95
Cleveland J5, R2 .....7.95
Coatesville,Pa. L7 .....7.95
Conshohocken,Pa. A3 ...7.95
Economy,Pa. B14 .....7.95
Ecorse,Mich. G5 .....7.95
Fairfield,Ala. T2 .....7.95
Farrell,Pa. S3 .....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 .....7.95
Geneva,Utah C11 .....7.95
Houston S5 .....8.05
Ind.Harbor,Ind. I-2, Y1..7.95
Johnstown,Pa. B2 .....7.95
Munhall,Pa. U5 .....7.95
Pittsburgh J5 .....7.95
Seattle B3 .....8.85
Sharon,Pa. S3 .....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7.95
Sterling,Ill. N15 .....7.625
Warren,O. R2 .....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy

Aliquippa,Pa. J5 .....7.50
Claymont,Del. P4 .....7.50
Coatesville,Pa. L7 .....7.50
Economy,Pa. B14 .....7.50
Farrell,Pa. S3 .....7.50
Fontana,Calif. K1 .....8.30
Gary,Ind. U5 .....7.50
Houston S5 .....7.60
Ind.Harbor,Ind. Y1 .....7.50
Johnstown,Pa. B2 .....7.50
Lowellville,O. S3 .....7.50
Munhall,Pa. U5 .....7.50
Newport,Ky. A2 .....7.50
Pittsburgh J5 .....7.50
Seattle B3 .....8.40
Sharon,Pa. S3 .....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2..7.50
Youngstown Y1 .....7.50

PLATES, Ingot Iron

Ashland c.l.(15) A10 ...5.55
Ashland l.c.l.(15) A10 ..6.05
Cleveland c.l. R22 .....6.05
Warren,O. R2 .....6.05

FLOOR PLATES

Cleveland J5 .....6.375
Claymont,Del. P4 .....6.375
Conshohocken,Pa. A3 ..6.375
Ind.Harbor,Ind. I-2 ...6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
S.Chicago,Ill. U5 .....6.375

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2 ...5.675
Aliquippa,Pa.(9) J5 ...5.675
Alton,Ill. L1 .....5.875
Atlanta(9) A11 .....5.875
Bessemer,Ala.(9) T2 ...5.675
Birmingham(9) C15 ...5.675
Buffalo(9) R2 .....5.675
Canton,O.(23) R2 .....6.15
Clairton,Pa.(9) U5 ....5.675
Cleveland(9) R2 .....5.675
Ecorse,Mich.(9) G5 ...5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala.(9) T2 ...5.675
Fairless,Pa.(9) U5 ....5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 .....5.675
Houston(9) S5 .....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P2 .....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
LosAngeles(9) B3 .....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18 ..6.025
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 .....6.375
Owensboro,Ky.(9) G8 ..6.025
Pittsburg,Calif.(9) C11.6.375
Pittsburgh(9) J5 .....5.675
Portland,Oreg. O4 .....6.425
Riverdale,Ill.(9) A1 ...5.675
Seattle(9) A24,B3,N15..6.425
S.Ch'e'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9) B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ....5.775
Struthers,O.(9) Y1 ....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11.6.375
Warren,O. C17 .....6.025
Youngstown(9) R2, U5.5.675

BARS, Hot-Rolled Alloy

Aliquippa,Pa. J5 .....6.725
Bethlehem,Pa. B2 .....6.725
Bridgeport,Conn. C32 ...6.80
Buffalo R2 .....6.725
Canton,O. R2, T7 .....6.725
Clairton,Pa. U5 .....6.725
Detroit S41 .....6.725
Economy,Pa. B14.....6.725
Ecorse,Mich. G5 .....6.725
Farrell,Pa. S3 .....6.725
Fontana,Calif. K1 .....7.775
Gary,Ind. U5 .....6.725
Houston S5 .....6.975
Ind.Harbor,Ind. I-2, Y1.6.725
Johnstown,Pa. B2 .....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 .....7.775
Lowellville,O. S3 .....6.725
Massillon,O. R2 .....6.725
Midland,Pa. C18 .....6.725
Owensboro,Ky. G8 .....6.725
Pittsburgh J5 .....6.725
Seattle(6) B3 .....7.825
Sharon,Pa. S3 .....6.725
S.Chicago R2, U5, W14 6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 .....6.725
Warren,O. C17 .....6.725
Youngstown U5.....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....8.30
Bessemer,Ala. T2 .....8.30
Bethlehem,Pa. B2 .....8.30
Clairton,Pa. U5 .....8.30
Cleveland R2 .....8.30
Ecorse,Mich. G5 .....8.30
Fairfield,Ala. T2 .....8.30
Fontana,Calif. K1 .....9.00
Gary,Ind. U5 .....8.30
Houston S5 .....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 .....8.30
KansasCity,Mo. S5 .....8.55
Lackawanna,N.Y. B2 ...8.30
LosAngeles B3 .....9.00
Pittsburgh J5 .....8.30
Seattle B3 .....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 .....9.05
Sterling,Ill. N15 .....7.925
Struthers,O. Y1 .....8.30
Youngstown U5 .....8.30

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 .....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 .....5.775
Sterling,Ill.(1) N15 ...5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. SHAPES

Aliquippa,Pa. J5 .....5.675
Atlanta A11 .....5.875
Joliet,Ill. P22 .....5.675
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 .....6.425
SanFrancisco S7 .....6.52
Seattle B3 .....6.425

BAR SIZE ANGLES; S. SHAPES Wrought Iron

Economy,Pa. B14 .....16.45

BAR SHAPES, Hot-Rolled Alloy

Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....7.05
KansasCity,Mo. S5 .....7.05
Pittsburgh J5 .....6.80
Youngstown U5 .....6.80

BARS, C.F. Leaded (Including leaded extra)

Carbon

LosAngeles P2, S30...11.75*

Alloy

Ambridge,Pa. W18 ...10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J. P13 .....10.35
Chicago W18 .....10.175
Elyria,O. W8 .....10.175
Monaca,Pa. S17 .....10.175
Newark,N.J. W18 .....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 .....7.65
BeaverFalls,Pa. M12,R2 7.65
Birmingham C15 .....8.25
Buffalo B5 .....7.70
Camden,N.J. P13 .....8.10
Carnegie,Pa. C12 .....7.65
Chicago W18 .....7.65
Cleveland A7, C20 .....7.65
Detroit B5, H5, P17 ....7.85
Detroit S41 .....7.65
Donora,Pa. A7 .....7.65
Elyria,O. W8 .....7.65
FranklinPark,Ill. N5 ...7.65
Gary,Ind. R2 .....7.65
GreenBay,Wis. F7 .....7.65
Hammond,Ind. J5, L2 ...7.65
Hartford,Conn. R2 .....8.15
Harvey,Ill. B5 .....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ...7.65
Midland,Pa. C18 .....7.65
Monaca,Pa. S17 .....7.65
Newark,N.J. W18 .....8.10
NewCastle,Pa.(17) B4 ...7.65
Pittsburgh J5 .....7.65
Plymouth,Mich. P5 .....7.90
Putnam,Conn. W18 .....8.20
Readville,Mass. C14 ....8.20
Seattle(49) S30 .....9.10
S.Chicago,Ill. W14 .....7.65
SpringCity,Pa. K3 .....8.10
Struthers,O. Y1 .....7.65
Warren,O. C17 .....7.65
Waukegan,Ill. A7 .....7.65
Willimantic,Conn. J5 ...8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Alloy (Turned and Ground)

Cumberland,Md.(5) C19.6.55

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa. M12,R2 9.025
Bethlehem,Pa. B2 .....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 .....9.025
Camden,N.J. P13 .....9.20
Canton,O. T7 .....9.025
Carnegie,Pa. C12 .....9.025
Chicago W18 .....9.025
Cleveland A7, C20 .....9.25
Detroit B5, P17 .....9.225
Detroit H5, S41 .....9.025
Donora,Pa. A7 .....9.025
Elyria,O. W8 .....9.025
FranklinPark,Ill. N5 ..9.025
Gary,Ind. R2 .....9.025
GreenBay,Wis. F7 .....9.025

Hammond,Ind. J5, L2. .9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. R5 .....9.025
Lackawanna,N.Y. B3 ..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ...9.325
Massillon,O. R2, R8 ...9.025
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark,N.J. W18 ....9.20
Plymouth,Mich. P5 ...9.225
S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 ....9.20
Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 ....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

Atlanta A11 .....5.00
Birmingham C15 .....5.25
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ..6.425
Fontana,Calif. K1 ....6.375
Ind.Harbor,Ind. Y1 ....5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2 ..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.475
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 .....6.425
Seattle A24, B3, N14 ..6.425
S.Chicago,Ill. W14 ....5.675
S.SanFrancisco B3 ...6.425
SparrowsPoint,Md. B2 .5.675
Steelton,Pa. B2 .....5.675
Sterling,Ill. (1) N15 ..5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ..6.10

BARS, Reinforcing, Billet (Fabricated, to Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Johnstown,Pa. B2 .....7.33
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
Seattle A24, B3, N14 ..7.95
SparrowsPoint,Md. B2 ..7.33
St.Paul U8 .....8.17

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 16.10
Economy,Pa.(D.R.)B14 20.50
Econ.(DirectRolled)B14 13.55
Economy(Staybolt) B14 20.50
McK.Rks.(S.R.) L5 ...16.10
McK.Rks.(D.R.) L5 ...20.50
McK.Rks.(DirRolled)L5 13.55

BARS, Rail Steel

ChicagoHts.(3) C2, I-2 5.575
ChicagoHts.(4)(44) I-2 5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ...5.575
Franklin,Pa.(4) F5 ...5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 ....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 .....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1 5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 .....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14 ..5.10
SparrowsPoint,Md. B2 .5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 .....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 ....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 ....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14 .7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2 .7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ...6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ..7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ...6.275
SparrowsPoint,Md. B2 .6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 ....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.125	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.125	....
Fairfield,Ala. T2	7.125	7.375
Gary,Ind. U5	7.125	7.375
GraniteCity,Ill.G4	7.225	....
Ind.Harbor I-2	7.225	7.425
Irvin,Pa. U5	7.125	7.375
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.125	7.375
Pitts.,Calif. C11	7.875	....
Pittsburgh J5	7.125	....
SparrowsPt. B2	7.225	....
Weirton W6	7.125	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2....7.475

SHEETS, Enameling

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Longe Terne, Steel

Follansbee,W.Va. W10 .7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) 9.525

SHEETS, Well Casing

Fontana,Calif. K1 .....7.325
Geneva,Utah C11 .....6.80

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.175
Irvin,Pa. U5 .....7.175

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Canfield,O. C3 .....7.50
Cleveland (28) R2 ....7.65
Niles,O. (28) R2 .....7.65
Weirton,W.Va. W6 ....7.50

SHEETS, Galvanized Steel Hot-Dipped§

AlabamaCity,Ala. R2 .6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ..6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ..6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous. §For minimum spangled add 0.15c.

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.
A25 Algoma Steel Corp. Ltd.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C3 Canfield Steel Co.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N. Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H5 Hercules Drawn Steel
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
M23 Mill Strip Products Co. of Pennsylvania

N1 National Standard Co.
N2 National Supply, Armco Steel Corp.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil.Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 RelianceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div. Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw&SteelCo.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Div., Bliss & Laughlin Inc.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America
S45 Somers Brass Co.
S46 Steel Co. of Canada

T2 Tenn. Coal & Iron Div. U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope, Armco Steel Corp.
U4 Universal-Cyclops Steel
U5 U. S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloy Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Div., National Steel Corp.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

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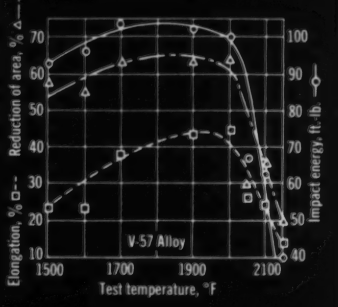

Plot of tensile-impact properties indicates that the recommended hot working range of Carpenter's V-57 alloy in wrought form lies between 1700 and 2000°F.

fast, new test pinpoints best forging range for high temperature alloys

A fast, easy and economical, new Carpenter test takes much of the guesswork out of hot working high temperature alloys. The results, when correlated with other Carpenter test data and mill experience, reveal the best working temperatures—help forge shops get better finishes with less machine clean-up . . . less wasted steel . . . fewer rejects . . . faster fabricating.

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Export Dept., Port Washington, N.Y.—"CARSTEELCO"
Alloy Tube Division, Union, N.J.
Webb Wire Division, New Brunswick, N.J.
Carpenter Steel of New England, Inc., Bridgeport, Conn.

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ...5.10
Allenport,Pa. P7 .....5.10
Alton,Ill. L1 .....5.30
Ashland,Ky.(8) A10 ....5.10
Atlanta A11 .....5.10
Bessemer,Ala T2 .....5.10
Birmingham C15 .....5.10
Conshohocken,Pa. A3 ...5.15
Detroit M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 .....5.825
Gary,Ind. U5 .....5.10
Ind.Harbor,Ind. I-2, Y1.5.10
Johnstown,Pa.(25) B2 ..5.10
Lackaw'na,N.Y.(25) B2.5.10
LosAngeles(25) B3 .....5.85
LosAngeles C1 .....8.60
Minnequa,Colo. C10 ....6.20
Riverdale,Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle(25) B3 .....6.10
Seattle N14 .....6.60
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. W14 .....5.10
S.SanFrancisco(25) B3 ..5.85
SparrowsPoint,Md. B2 ..5.10
Torrance,Calif. C11 ....5.85
Warren,O. R2 .....5.10
Weirton,W.Va. W6 .....5.10
Youngstown U5, Y1 ....5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.40
Farrell,Pa. S3 .....8.40
Gary,Ind. U5 .....8.40
Houston S5 .....8.65
Ind.Harbor,Ind. Y1 .....8.40
KansasCity,Mo. S5 .....8.65
LosAngeles B3 .....9.60
Lowellville,O. S3 .....8.40
Newport,Ky. A2 .....8.40
Sharon,Pa. A2, S3 .....8.40
S.Chicago,Ill. W14 .....8.40
Youngstown U5, Y1 ....8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10 .....7.575
Bessemer,Ala. T2 .....7.575
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.575
Fairfield,Ala. T2 .....7.575
Farrell,Pa. S3 .....7.575
Ga.y,Ind. U5 .....7.575
Ind.Harbor,Ind. I-2, Y1.7.575
Lackawanna,N.Y. B2 ..7.575
LosAngeles(25) B3 ....8.325
Seattle(25) B3 .....8.575
Sharon,Pa. S3 .....7.575
S.Chicago,Ill. W14 ....7.575
S.SanFrancisco(25) B3.8.325
SparrowsPoint,Md. B2 .7.575
Warren,O. R2 .....7.575
Weirton,W.Va. W6 ....7.575
Youngstown U5, Y1 ...7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ....5.35
Warren,O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7 .....7.425
Dearborn,Mich. S3 .....7.425
Detroit D2, M1, P20 ..7.425
Dover,O. G6 .....7.425
Evanston,Ill. M22 .....7.425
Farrell,Pa. S3 .....7.425
Follansbee,W.Va. W10 .7.425
Fontana,Calif. K1 .....9.20
FranklinPark,Ill. T6 ...7.425
Ind.Harbor,Ind. Y1 ....7.425
Indianapolis S41 .....7.575
LosAngeles C1, S41 ....9.30
McKeesport,Pa. E10 ...7.525
NewBedford,Mass. R10.7.875
NewBritain,Conn. S15 .7.875
NewCastle,Pa. B4, M23.7.425
NewHaven,Conn. D2 ...7.875
NewKensington,Pa. A6.7.425
Pawtucket,R.I. R3, N8.7.975
Philadelphia P24 .....7.875
Riverdale,Ill. A1 .....7.425
Rome,N.Y.(32) R6 ....7.425
Sharon,Pa. S3 .....7.425
Trenton,N.J.(31) R5 ...8.875
Warren,O. R2, T5 ....7.425
Worcester,Mass. A7 ...7.975
Youngstown Y1 .....7.425
Youngstown S41 .....7.425

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Carnegie,Pa. S18 .....15.55
Cleveland A7 .....15.55
Dover,O. G6 .....15.55
Farrell,Pa. S3 .....15.55
FranklinPark,Ill. T6 ..15.55
Harrison,N.J. S18 .....15.55
Indianapolis S41 .....15.70
LosAngeles S41 .....17.75
Lowellville,O. S3 .....15.55
Pawtucket,R.I. S8 .....15.90
Riverdale,Ill. A1 .....15.55
Sharon,Pa. S3 .....15.55
Worcester,Mass. A7 ...15.85
Youngstown S41 .....15.55

STRIP, Cold-Rolled High Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn,Mich. S3 ....10.80
Dover,O. G6 .....10.80
Farrell,Pa. S3 .....10.80
Ind.Harbor,Ind. Y1 ....10.80
Sharon,Pa. S3 .....10.80
Warren,O. R2 .....10.80
Weirton,W.Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Galvanized (Continuous)

Farrell,Pa. S3 .....7.50
Sharon,Pa. S3 .....7.50

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Anderson,Ind. G6	9.10	....	....	....	....
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	9.05	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	....	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, M23	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
New York W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria,O. S1	19.05	22.15	....
FranklinPark,Ill. T6	19.20	23.30	28.15
Harrison,N.J. C18	18.85	22.95	27.80
NewYork W3	18.85	22.95	27.80
Palmer,Mass. W12	18.85	....	....
Trenton,N.J. R5	18.85	22.95	27.80
Worcester,Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

STRIP, C.R., Electrogalvanized

Cleveland A7 .....7.425*
Dover,O. G6 .....7.425*
Evanston,Ill. M22 ....7.525*
McKeesport,Pa. E10 ..7.50*
NewCastle,Pa. M23 ..7.425*
Riverdale,Ill. A1 .....7.525*
Warren,O. B9, S3, T5.7.425*
Worcester,Mass. A7 ...7.975
Youngstown S41 .....7.425*

*Plus galvanizing extras.

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....8.175

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.825
Farrell,Pa. S3 .....5.525
Riverdale,Ill. A1 .....5.675
Sharon,Pa. S3 .....5.525
Youngstown U5 .....5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.10	9.35	9.75
Fairless,Pa. U5	9.10	9.35	9.75
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.85
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorksville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)

Aliquippa,Pa. J5 (21-27 Ga.)	7.90	8.10	....
IndianaHarbor,Ind. Y1 (20-27 Ga.).	7.90	....	....
Niles,O. R2 (20-27 Ga.)	7.90	8.10	8.30

ELECTROLYTIC THIN TIN PLATE (¼ lb coating in coils)

	Base Box 45 lb	50 lb	55 lb	60 lb
Fairfield,Ala. T2	$6.10	$6.25	$6.40	$6.55
Fairless,Pa. U5	6.10	6.25	6.40	6.55
Gary,Ind. U5	6.10	6.25	6.40	6.55
IndianaHarbor,Ind. I-2	6.10	6.25	6.40	6.55
Irvin,Pa. U5	6.10	6.25	6.40	6.55
SparrowsPoint,Md. B2	6.10	6.25	6.40	6.55
Weirton,W.Va. W6	6.10	6.25	6.40	6.55

Tin Plate,Hot Dipped Common Coke	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.40	10.65
Fairless,Pa. U5	10.40	10.65
Fontana,Calif.K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va. W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5 .....$8.20
Fairfield,Ala. T2 .....8.20
Fairless,Pa. U5 .....8.20
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....8.20
GraniteCity,Ill. G4 ....8.30
Ind.Harbor,Ind. I-2, Y1.8.20
Irvin,Pa. U5 .....8.20
Niles,O. R2 .....8.20
Pittsburg,Calif. C11 ....8.85
SparrowsPoint,Md. B2 ..8.20
Weirton,W.Va. W6 .....8.20
Yorkville,O. W10 .....8.20

HOLLOWARE ENAMELING (Black Plate) (29 Gage)

Aliquippa,Pa. J5 .....7.85
Gary,Ind. U5 .....7.85
GraniteCity,Ill. G4 ....7.95
Ind.Harbor,Ind. Y1 ....7.85
Irvin,Pa. U5 .....7.85
Yorkville,O. W10 .....7.85

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

Stator	
Mansfield,O. E6	8.10
Vandergrift,Pa. U5	8.10
Warren,O. R2 (Locore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coil annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ...8.00
Aliquippa,Pa. J5 .....8.00
Alton,Ill. LI 8.20
Atlanta A1 .....8.00
Bartonville,Ill. K4 ....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 ....8.00
Crawfordsville,Ind. MS..8.10
Donora,Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield,Ala. T2 .....8.00
Fostoria,O.(24) S1 ....8.10
Houston S5 .....8.25
Jacksonville,Fla. M8 ...8.35
Johnstown,Pa. B2 .....8.00
Joliet,Ill. A7 .....8.00
KansasCity,Mo. S5 ....8.25
Kokomo,Ind. C16 .....8.10
LosAngeles B3 .....8.95
Minnequa,Colo. C10 ....8.25
Monessen,Pa. P7, P16 ..8.00
Palmer,Mass. W12 ....8.30
Pittsburg,Calif. C11 ...8.95
Portsmouth,O. P12 ....8.00
S.Chicago,Ill. R2 .....8.00
S.SanFrancisco C10 ....8.95
SparrowsPoint,Md. B2 ..8.10
Sterling,Ill.(1) N15 ....8.00
Sterling,Ill. N15 .....8.10
Struthers,O. Y1 .....8.00
Waukegan,Ill. A7 .....8.00
Worcester,Mass. A7 ...8.30

WIRE, Cold Heading Carbon

Elyria,O. W8 .....8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4 ....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown,Pa.(10) B2 .12.65
KansasCity,Mo. U3 ....12.90
LosAngeles(2) B3 ....13.60
Minnequa,Colo. C10 ...12.775
Monessen,Pa. P7, P16..12.65
Muncie,Ind. I-7 .....13.60
NewHaven,Conn. A7 ...12.95
Palmer,Mass. W12 ....13.70
Pittsburg,Calif. C11 ...13.45
Portsmouth,O. P12 ....12.65
Roebling,N. J. R5 ....12.95
SparrowsPt.,Md.(10)B2 12.75
Struthers,O. Y1 .....13.40
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 ....12.65
Worcester,Mass. A7 ...12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
Kokomo,Ind. C16 .....9.85
LosAngeles B3 .....10.70
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
NewHaven,Conn. A7 ..10.95
Palmer,Mass. W12 ....10.05
Pittsburg,Calif. C11 ..10.075
Portsmouth,O. P12 ....9.75
Roebling,N. J. R5 ....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ....10.70
SparrowsPt.,Md. B2 ....9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Worcester,Mass. A7 ..10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Bartonville,Ill. K4 ....9.85
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Fostoria,O. S1 .....9.80
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
LosAngeles B3 .....10.20
Milbury,Mass.(12) N6 .10.05
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
Muncie,Ind. I-7 .....9.95
Palmer,Mass. W12 ....10.05
Pittsburg,Calif. C11 ...10.20
Portsmouth,O. P12 ....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ...10.70
SparrowsPt.,Md. B2 ....9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Wor'ster,Mass.A7,J4,T6 10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1 .....16.50
Bartonville,Ill. K4 ....16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville,Ind. MS.16.40
Fostoria,O. S1 .....16.30
Houston S5 .....16.55
Jacksonville,Fla. M8 ...16.65
Johnstown,Pa. B2 ....16.30
KansasCity,Mo. S5 ....16.55
Kokomo,Ind. C16 .....16.30
Minnequa,Colo. C10 ...16.55
Monessen,Pa. P16 ....16.30
Muncie,Ind. I-7 .....16.50
Palmer,Mass. W12 ....16.60
S.SanFrancisco C10 ...17.15
Waukegan,Ill. A7 ....16.30
Worcester,Mass. A7, J6.16.60

ROPE WIRE (A)

Bartonville,Ill. K4 ....13.45
Buffalo W12 .....13.45
Fostoria,O. S41 .....13.45
Johnstown,Pa. B2 .....13.45
Monessen,Pa. P7 .....13.45
Muncie,Ind. I-7 .....13.65
Palmer,Mass. W12 ....13.75
Portsmouth,O. P12 ....13.45
Roebling,N.J. R5 .....13.75
St.Louis L8 .....13.45
SparrowsPt.,Md. B2 ...13.55
Struthers,O. Y1 .....13.45
Worcester,Mass. J4 ...13.75
(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead

Bartonville,Ill. K4 .....17.15
Monessen,Pa. P16 .....17.15
Roebling,N.J. R5 .....17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6 .....12.35
Baltimore T6 .....12.65
Boston T6 .....12.65
Buffalo W12 .....12.35
Chicago W13 .....12.45
Cleveland A7 .....12.35
Crawfordsville,Ind. M8..12.35
Dover,O. G6 .....12.35
Evanston,Ill. M22 .....12.45
Farrell,Pa. S3 .....12.35
Fostoria,O. S1 .....12.35
FranklinPark,Ill. T6 ..12.45
Kokomo,Ind. C16 .....12.35
Massillon,O. R8 .....12.35
Milwaukee C23 .....12.55
Monessen,Pa. P7, P16..12.35
NewCastle,Pa. M23 ...12.35
Palmer,Mass. W12 ....12.65
Pawtucket,R.I. N8 ....12.65
Philadelphia P24 .....12.65
Riverdale,Ill. A1 .....12.45
Rome,N.Y. R6 .....12.35
Sharon,Pa. S3 .....12.35
Trenton,N.J. R5 .....12.65
Warren,O. B9 .....12.35
Worcester,Mass. A7, T6.12.65

NAILS, Stock Sizes — Col.

AlabamaCity,Ala. R2 ...173
Aliquippa,Pa. J5 173
Atlanta A11 173
Bartonville,Ill. K4 175
Chicago W13 173
Cleveland A9 173
Crawfordsville,Ind. M8 ..175
Donora,Pa. A7 173
Duluth A7 173
Fairfield,Ala. T2 173
Houston S5 178
Jacksonville,Fla. M8 175
Johnstown,Pa. B2 173
Joliet,Ill. A7 173
KansasCity,Mo. S5 178
Kokomo,Ind. C16 175
Minnequa,Colo. C10 178
Monessen,Pa. P7 173
Pittsburg,Calif. C11 192
Rankin,Pa. A7 173
S.Chicago,Ill. R2 173
SparrowsPt.,Md. B2 175
Sterling,Ill. (7) N15 175
Worcester,Mass. A7 179

(To Wholesalers: per cwt)

Galveston,Tex. D7 ...$10.30

NAILS, Cut (100 lb kegs)

Wheeling,W.Va. W10..$10.10

POLISHED STAPLES — Col.

AlabamaCity,Ala. R2 175
Aliquippa,Pa. J5 173
Atlanta A11 173
Bartonville,Ill. K4 175
Crawfordsville,Ind. M8 ..177
Donora,Pa. A7 173
Duluth A7 173
Fairfield,Ala. T2 173
Houston S5 180
Jacksonville,Fla. M8 177
Johnstown,Pa. B2 173
Joliet,Ill. A7 173
KansasCity,Mo. S5 180
Kokomo,Ind. C16 177
Minnequa,Colo. C10 178
Pittsburg,Calif. C11 194
Rankin,Pa. A7 173
S.Chicago,Ill. R2 175
SparrowsPt.,Md. B2 175
Sterling,Ill. (7) N15 175
Worcester,Mass. A7 179

TIE WIRE, Automatic Baler (14½ Ga.) (per 97 lb net box) Coil No. 3150

AlabamaCity,Ala. R2 ..$8.78
Atlanta A11 .....10.36
Bartonville,Ill. K4 .....8.88
Buffalo W12 .....10.26
Chicago W13 .....9.24
Crawfordsville,Ind. M8 ..8.88
Donora,Pa. A7 .....8.78
Duluth A7 .....8.78
Fairfield,Ala. T2 .....8.78
Houston S5 .....9.02
Jacksonville,Fla. M8 ....8.88
Johnstown,Pa. B2 .....8.78
Joliet,Ill. A7 .....8.78
KansasCity,Mo. S5 .....9.02
Kokomo,Ind. C16 .....8.88
LosAngeles B3 .....9.20
Minnequa,Colo. C10 ....8.02
Pittsburg,Calif. C11 ....9.20
S.Chicago,Ill. R2 .....8.78
S.SanFrancisco C10 ....9.94
SparrowsPt.,Md. B2 ....8.88
Sterling,Ill. (37) N15 ....8.88

Coil No. 6500 Stand. 100 lb coil

AlabamaCity,Ala. R2 ..$9.06
Atlanta A11 .....10.70
Bartonville,Ill. K4 .....9.16
Buffalo W12 .....10.60
Chicago W13 .....9.54
Crawfordsville,Ind. M8..9.16
Donora,Pa. A7 .....9.06
Duluth A7 .....9.06
Fairfield,Ala. T2 .....9.06
Houston S5 .....9.30
Jacksonville,Fla. M8 ....9.16
Johnstown,Pa. B2 .....9.06
Joliet,Ill. A7 .....9.06
KansasCity,Mo. S5 .....9.30
Kokomo,Ind. C16 .....9.16
LosAngeles B3 .....9.50
Minnequa,Colo. C10 ....9.30
Pittsburg,Calif. C11 ....9.50
S.Chicago,Ill. R2 .....9.06
S.SanFrancisco C10 ...10.26
SparrowsPt.,Md. B2 ....9.16
Sterling,Ill. (37) N15 ....9.16

Coil No. 6500 Interim 100 lb coil

AlabamaCity,Ala. R2 ..$9.11
Atlanta A11 .....10.75
Bartonville,Ill. K4 .....9.21
Buffalo W12 .....10.65
Chicago W13 .....9.59
Crawfordsville,Ind. M8..9.21
Donora,Pa. A7 .....9.11
Duluth A7 .....9.11
Fairfield,Ala. T2 .....9.11
Houston S5 .....9.35
Jacksonville,Fla. M8 ....9.21
Johnstown,Pa. B2 .....9.11
Joliet,Ill. A7 .....9.11
KansasCity,Mo. S5 .....9.35
Kokomo,Ind. C16 .....9.21
LosAngeles B3 .....9.55
Minnequa,Colo. C10 ....9.35
Pittsburg,Calif. C11 ....9.55
S.Chicago,Ill. R2 .....9.11
S.SanFrancisco C10 ...10.31
SparrowsPt.,Md. B2 ....9.21
Sterling,Ill. (37) N15 ....9.21

BALE TIES, Single Loop — Col.

AlabamaCity,Ala. R2 ...212
Atlanta A11 212
Bartonville,Ill. K4 214
Crawfordsville,Ind. M8 ..214
Donora,Pa. A7 212
Duluth A7 212
Fairfield,Ala. T2 212
Houston S5 217
Jacksonville,Fla. M8 214
Joliet,Ill. A7 212
KansasCity,Mo. S5 212
Kokomo,Ind. C16 214
Minnequa,Colo. C10 217
SparrowsPt.,Md. B2 214
Sterling,Ill. (7) N15 214

FENCE POSTS — Col.

Birmingham C15 177
ChicagoHts.,Ill. C2 I-2 ..177
Duluth A7 177
Franklin,Pa. F5 177
Johnstown,Pa. B2 177
Marion,O. P11 177
Minnequa,Colo. C10 182
Tonawanda,N.Y. B12 177

WIRE, Barbed — Col.

AlabamaCity,Ala. R2 ..193**
Aliquippa,Pa. J5 .....190§
Atlanta A11 .....197*
Bartonville,Ill. K4 199
Crawfordsville,Ind. M8 ..198
Donora,Pa. A7 .....193†
Duluth A7 .....193†
Fairfield,Ala. T2 .....193†
Houston S5 .....198**
Jacksonville,Fla. M8 198
Johnstown,Pa. B2 .....196§
Joliet,Ill. A7 .....193†
KansasCity,Mo. S5 ....198**
Kokomo,Ind. C16 .....195†
Minnequa,Colo. C10 ...198**
Monessen,Pa. P7 .....196§
Pittsburg,Calif. C11 ...213†
Rankin,Pa. A7 .....193†
S.Chicago,Ill. R2 ....193**
SparrowsPoint,Md. B2 ..198§
Sterling,Ill. (7) N15 198

WIRE (16 gage) — An'ld Stone — Galv. Stone

Ala.City,Ala.R2 17.85 19.40**
Aliq'ppa,Pa. J5 ..17.85 19.65
Bartonville K4 ...17.95 19.80
Chicago W13 ....17.85 ....
Cleveland A7 ....17.85 ....
Craw'sville M8..17.95 19.80‡‡
Fostoria,O. S1 ..18.35 19.90†
Houston S5 ....18.10 19.65**
Jacksonville M8 17.95 19.80‡‡
Johnstown B2 ..17.85 19.65§
Kan.City,Mo. S5..18.10 ....
Kokomo C16 ...17.95 19.50†
Minnequa C10..18.10 19.65**
P'lm'r,Mass.W12 19.10 19.70†
Pitts.,Calif. C11 18.20 19.75†
S.SanFran. C10.18.20 19.75**
SparrowsPt. B2 ..17.95 19.75§
St'ling(37) N15 ..17.95 19.80
Waukegan A7 ..17.85 19.40†
Worcester A7 ....18.15 ....

WOVEN FENCE, 9-15 Ga. — Col.

Ala.City,Ala. R2 .....187**
Aliq'ppa,Pa.9-11½ga.J5 190§
Atlanta A11 .....191*
Bartonville,Ill. K4 193
Crawfordsville,Ind. M8 ..192
Donora,Pa. A7 .....187†
Duluth A7 .....187†
Fairfield,Ala. T2 .....187†
Houston S5 .....192**
Jacksonville,Fla. M8 192
Johnstown,Pa.(42) B2 ..190§
Joliet,Ill. A7 .....187†
KansasCity,Mo. S5 ....192**
Kokomo,Ind. C16 .....189†
Minnequa,Colo. C10 ...192**
Pittsburg,Calif. C11 ....210†
Rankin,Pa. A1 .....187†
S.Chicago,Ill. R2 .....187**
Sterling,Ill.(7) N15 192

WIRE, Merchant Quality — 6 to 8 gage — An'ld Galv.

Ala.City,Ala. R2..9.00 9.55**
Aliquippa J5 ....8.65 9.325§
Atlanta(48) A11 ..9.00 9.75*
Bartonville(48) K4 9.85 19.90
Buffalo W12 .....9.00 9.55†
Chicago W13 ....9.00 9.55**
Cleveland A7 .....9.00 ....
Crawfordsville M8 9.10 9.80††
Donora,Pa. A7 ...9.00 9.55†
Duluth A7 .....9.00 9.55†
Fairfield T2 .....9.00 9.55
Houston(48) S5 ..9.25 9.80**
Jack'ville,Fla. M8 9.10 9.80‡‡
Johnstown(48) B2 9.00 9.675§
Joliet,Ill. A7 .....9.00 9.55†
KansasCity(48)S5 9.25 9.80**
Kokomo(48) S16 ..9.10 9.65†
LosAngeles B3 ..9.95 10.625§
Minnequa C10 ...9.25 9.80**
Monessen(48) P7..8.65 9.35§
Palmer,Mass. W12.9.30 9.85†
Pitts.,Calif. C11..9.95 10.50†
Rankin,Pa. A7 ....9.00 9.55†
S.Chicago R2 ....9.00 9.55**
S.SanFran. C10..9.95 10.50**
Spar'wsPt.(48)B2 9.10 9.775§
St'ling(37)(48)N15 .9.10 9.80
Struthers,O. Y1....9.00 9.65‡
Worcester,Mass.A7 9.30 9.85†

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less than 10c ††10.50c. ‡‡11.10c. **Subject to zinc equalization extras.

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in. larger 12.85 7/16 in. and smaller by 6 in. and shorter: 15% off list.

FASTENERS

(Consumer discounts per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent: heavy hex nuts 1⅛ in. through 1½ in. tapped 8 threads, add 10 per cent.)

HEX HEAD CAP SCREWS, coarse, or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:

Hot Galvanized and Zinc Plated:
Packaged 39.25
Bulk 46

BOLTS, Standard stock sizes: Plain Finish 50
Hot Galvanized and Zinc Plated:
Packaged 39.25
*Bulk 46

*Hot galvanized or zinc plated lag bolts only—for package or bulk quantities use applicable list less bulk discounts.

CAP AND SETSCREWS, Fillister Head, Cap Screws, Coarse Thread:
Packaged ..... +55
Bulk ..... +16

Flat Head Cap Screws:
¾ in. and smaller, 6 in. and shorter:
Packaged ..... +85
Bulk ..... +38

Setscrews, Square Head, Cup Point, Coarse Thread:
Through 1 in. diam., 6 in. and shorter:
Packaged ..... + 5
Bulk 19
Through 1 in. diam., longer than 6 in.:
Packaged ..... +29

HEXAGON NUTS: American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.: Plain Finish 50
Hot Galvanized and Zinc Plated:
Packaged 39.25
Bulk 46

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over.)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa,Colo. C10	26.20	38.50	47.90	61.30	80.30
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling,N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St. Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.12
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	58.17	40.26
2½	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	Standard All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....(16)	6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....

TIE PLATES

Fairfield,Ala. T2 .....6.875
Gary,Ind. U5 .....6.875
Lackawanna,N.Y. B2..6.875
Minnequa,Colo. C10 ...6.875
Seattle B3 .....7.025
Steelton,Pa. B2 .....6.875
Torrance,Calif. C11 ..7.025

JOINT BARS

Bessemer,Pa. U5 .....7.25
Fairfield,Ala. T2 .....7.25
Joliet,Ill. U5 .....7.25
Lackawanna,N.Y. B2 ....7.25
Minnequa,Colo. C10 ....7.25
Steelton,Pa. B2 .....7.25

AXLES

Ind.Harbor,Ind. S13 ...9.125
Johnstown,Pa. B2 .....9.125

SCREW SPIKES

Lebanon,Pa. B2 .....15.10

TRACK BOLTS, Untreated

Cleveland R2 .....15.35
KansasCity,Mo. S5 ....15.35
Lebanon,Pa. B2 .....15.35
Minnequa,Colo. C10 ....15.35
Pittsburgh S44 .....15.35
Seattle B3 .....15.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2 .....10.10
Ind.Harbor,Ind. I-2, Y1.10.10
KansasCity,Mo. S5 ....10.10
Lebanon,Pa. B2 .....10.10
Minnequa,Colo. C10 ...10.10
Pittsburgh J5 .....10.10
Seattle B3 .....10.60
S.Chicago,Ill. R2 .....10.10
Struthers,O. Y1 .....10.10
Youngstown R2 .....10.10

FOOTNOTES

(1) Chicago base.
(2) Double galvanized.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Limited analyses only.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Bethany A coating.
(12) Worcester, Mass., base.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c. for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in., and smaller rounds and 2½ in. and smaller hexagons; 9.625c for larger rounds and hexagons and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 11.50c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	43.50
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	46.75
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	45.00
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	49.50
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	29.50	39.50	40.50	44.25	46.75	45.75	52.00	49.50
304L	....	37.25	47.25	48.25	52.00	54.50	53.50	59.75	57.25
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.75	75.75	71.75	80.75	76.75
316L	....	55.25	72.25	76.25	79.50	83.50	79.50	88.50	84.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.50	62.25
330	....	....	123.25	....	98.75	143.75	135.00	149.25	149.25
18-8 Cb-Ta	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	75.25
403	....	....	26.75	....	29.75	31.50	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	26.75	31.00	29.75	31.50	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	38.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	42.00
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Prooducts; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Somers Brass Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steels, Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates 5%	Plates Carbon Base 10%	Plates Carbon Base 15%	Plates Carbon Base 20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	36.10	43.00

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. P4; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot Work (H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

Prices in dollars per gross ton, f.o.b. (rail) furnace; add 50 cents when shipped by truck. Maximum delivered prices are approximate and based on rail shipment.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham R2	62.00	62.50**	66.50	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.81	69.31	69.31	69.81
Muskegon, Mich., deld.	....	74.46	74.46	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.41	75.91	....
Newark, N.J., deld.	72.53	73.03	73.53	74.03
Philadelphia, deld.	70.18	70.68	71.18	71.68
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), deld.	....	68.31	68.31	68.81
Monaca, Pa., deld.	....	68.33	68.33	68.83
Lawrenceville, W. Homestead, Wilmerding, Pa., deld.	....	68.68	68.68	69.18
Verona, Trafford, Pa., deld.	68.83	69.33	69.33	69.83
Brackenridge, Pa., deld.	69.16	69.66	69.66	70.16
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....

Other U. S. Districts	Basic	No. 2 Foundry	Malle-able	Besse-mer
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....
Mansfield, Ohio, deld.	....	....	71.34	....
Canadian District				
Hamilton, Ont. S46	65.00	65.00	65.50	....
Port Colborne, Ont. A25	65.00	65.00	65.50	66.00
Sault Ste. Marie, Ont. A25	65.00	65.00	65.50	66.00

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%. Foundry grade, 1.75% or under, deduct 50c.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 13%; starting with silicon over 13% add $1 per ton for each 0.50% silicon or portion thereof up to 14%; over 14%, price is $93 with $1 differential; add $1 for each 0.50% Mn over 1%)

Buffalo H1	$79.25
Jackson, Ohio I-3, J1	78.00
Port Colborne, Ont. A25	78.50
Toledo, Ohio I-3	78.00

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.50% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry, K2	89.00
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max).	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb orders. Prices will vary with total weight of the order. City delivery charges are 15 cents per 100 lb except: Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS			STRIP	BARS			STRUCTURAL	PLATES	
	Hot Rolled	Cold Rolled	Galv.	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.85	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	9.50	10.26	10.06	11.25	9.65	11.70	16.38	9.85	9.60	11.10
Birmingham	8.95	10.20	10.59	9.45	8.26	13.14	16.65	8.47	8.41	10.05
Boston	9.90	10.40	11.52	12.40	10.05	13.35	16.59	10.50	9.83	11.85
Buffalo	9.30	10.05	11.80	11.70	9.45	11.45	16.30	9.90	9.40	11.30
Charlotte, N. C.	9.95	11.22	10.55	11.35	10.00	12.68	....	10.20	9.95	11.75
Chicago	9.22	10.20	10.70	11.39	9.22	10.65	15.95	9.57	9.06	11.35
Cincinnati	9.38	10.26	10.75	11.71	9.33	11.53	16.27	10.14	9.44	11.68
Cleveland	9.22	10.66	10.92	11.51	9.33	11.25	16.06	9.96	9.30	11.59
Dallas	9.07	9.88	11.75	10.63	8.48	12.98	16.95	8.71	8.31	9.68
Detroit	9.48	10.46	11.06	11.76	9.53	11.01	16.23	10.14	9.43	11.61
Denver	9.41	11.77	12.11	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	8.67	9.48	11.35	10.23	8.08	13.10	16.55	8.31	7.91	11.57
Indianapolis	9.66	10.64	11.14	11.83	9.66	11.09	16.39	10.01	9.50	11.79
Kansas City	9.21	10.87	11.35	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	10.35	11.20	12.10	12.40	10.25	14.20	17.35	10.45	10.30	12.30
Memphis, Tenn.	9.63	10.35	10.80	11.29	9.48	12.70	16.53	9.67	9.32	11.18
Milwaukee	9.36	10.34	10.84	11.53	9.36	10.89	16.09	9.79	9.20	11.49
Moline, Ill.	9.57	10.55	11.05	11.74	9.57	11.00	16.30	9.92	9.41	11.70
Newark, N. J.	9.81	10.34	11.54	12.37	10.05	13.25	16.40	10.35	9.79	11.82
New York	10.07	10.78	11.35	12.37	10.44	13.25	16.40	10.90	10.22	11.83
Philadelphia	9.50	10.00	10.66	11.25	9.65	11.95	16.38	9.85	9.60	11.10
Pittsburgh	9.22	10.53	11.68	11.49	9.22	11.25	15.95	9.57	9.06	11.35
Portland, Oreg.	10.40	12.25	12.35	12.40	10.40	16.65	17.85	11.00	10.55	12.70
St. Louis	9.42	10.58	11.08	11.59	9.44	11.28	16.33	9.80	9.28	11.59
St. Paul	9.57	10.24	11.39	11.74	9.57	11.49	16.54	9.92	9.41	11.70
San Francisco	10.65	11.65	11.75	12.70	10.55	15.10	17.25	11.10	10.80	12.95
Seattle	11.35	12.45	13.40	12.80	10.80	16.20	17.85	11.50	10.95	13.60
Spokane, Wash.	11.20	12.30	13.25	12.65	10.65	16.20	17.85	11.35	10.80	13.45

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Los Angeles, Dallas and Houston, 10 Ga. x 48 x 120 in.; hot rolled strip, ⅛ in. x 1 in.; hot rolled carbon bars, rounds, ⅜ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅜ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plate, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hitchins, Olive Hill, Ky., Athens, Troup, Tex., Clearfield, Curwensville, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo.; Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., Frostburg, Md., $133; Templeton, Pa., $135; Salina, Pa., $138; Niles, Ohio, $139; Lehi, Utah, $175.

Super-Duty: Ironton, Ohio, St. Louis, Mexico, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Frostburg, Md., $200; Stevens Pottery, Ga., $210; Troup, Tex., $215; Lehi, Utah, $263.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Hawstone, Thompsontown, Pa., Ensley, Ala., Portsmouth, Ohio, St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Pa., $163; E. Chicago, Ind., Joliet, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $133; Philadelphia, Clearfield, Pa., $138; Warren, Ohio, $148.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Johnstown, Pa., Vandalia, Mo., $97; Chester, New Cumberland, W. Va., Freeport, Vanport, Merrill Station, Clearfield, Pa., Wellesville, Irondale, New Salisbury, Ohio, $100; Portsmouth, Ohio, $102; St. Louis, Mexico, Mo., $120; Lehi, Utah, $175.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $250; Danville, Ill., $253; Fords, N. J., Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., Frostburg, Md., $260; Troup, Tex., $265.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., Frostburg, Md., $320; Troup, Tex., Fords, N. J., Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., Frostburg, Md., $360; Troup, Tex., Fords, N. J., Philadelphia, $365.

Tar Bonded Brick (per ton)

Dolomite: Narlo, Ohio, $87.50. Dolomite-Magnesite: Narlo, Ohio, $109.50. Magnetite: Narlo, Ohio, $128.

Sleeves (per 1000)

St. Louis, $193; Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310; Reesdale, Pa., $355.

Runners (per 1000)

Johnstown, Bridgeburg, St. Charles, Clearfield, Pa., $234; Reesdale, Pa., $245.

Dolomite (per ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines, Chewelah, Wash., $46; minus ⅝ in. grains bulk, Luning, Nev., $46; ⅜ in. grains with fines (periclase), Baltimore, $73, Pascagoula, Miss., $90.

*—9 in. x 4½ x 2.50 straights.

Ores

Lake Superior Iron Ore

(Prices effective for the 1961 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi nonbessemer	$11.45
Mesabi bessemer	11.60
Old Range nonbessemer	11.70
Old Range bessemer	11.85
Open-hearth lump	12.70
High phos.	11.45

Based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1961; increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

New Jersey, concentrates ..... nom.

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.i.f. Atlantic ports	25.00†
Chilean, 62-65%, c.i.f. Atlantic ports	22.00
Brazilian (lump), 68.5%, f.o.b. vessel, Victoria, per ton	$11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$15.75-16.25*
Domestic, concentrates, f.o.b. milling points	22.00-23.00

Manganese Ore

Mn 46-48%, Indian, 85-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.75
48% no ratio	24.00-26.00†

Turkish

48% 3:1	35.00-37.00†

Domestic

Rail nearest seller

18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked $1.40

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$3.00-3.50
60-65%	3.60-4.00

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

*Before duty. †Nominal.

Canadian Steel

(Cents per lb, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:	
Carbon (N.T.):	
Forging	$97.00
Rerolling	78.00
Alloy (N.T.)	115.00
Wire Rods:	
Carbon	5.70
Alloy	6.40
Wire (carload lots):	
Merchant annealed	8.40
Low carbon indus.	7.20
Upholstery spring	8.55
M.B. spring	8.85
Bars & Small Shapes:	
Carbon, merchant	5.30
Carbon, special	5.85
Alloy	6.40
Bar Mill Brands:	
Carbon	5.40
Alloy	8.05
Bars, Reinforcing	5.30
Structural Shapes:	
Standard carbon	5.50
Angles & zees	5.40
Plates, Carbon:	
Sheared	5.45
Universal mill	5.10
Sheets & Coils, Hot Rolled:	
Carbon sheet	4.95
Carbon strip	5.00
Sheets & Coils, Cold Rolled:	
Carbon sheet	6.35
Carbon strip:	
(0.080 and lighter)	6.35
(0.081 and heavier)	6.35
Sheets & Coils, Galvanized:	
Standard quality	6.70
Culvert quality	7.00
Sheets, Porcelain Enameling	7.45
Sheets & Coils, Electrical:	
Field grade	9.00
Electrical grade	10.15
Sheet Piling	6.15
Skelp	4.70
Rails, Heavy	5.55
Rails, Light	5.70
Joint Bars	6.55
Tie Plates	6.35
Grinding Balls (3 in. diam.)	7.00
Tin Mill (Per base box;	
Products 100 lb base wt)	
Coke tin plate (1.25 lb pot yield)	$10.60
Electrolytic tin plate (0.25 lb coating).	9.10
Black plate	8.30
Nails, Wholesale:	
Carload lots	Col. 110

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $29-$29.50; barge, Brownsville, Tex., $30-$31.

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted.)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh, bags	7.50††
Electrolytic Iron, Melting stock, 99.9% Fe, irreg. fragments, ⅛ in. x 1.3 in.	27.75
(In contract lots of 750 tons price is 22.75c.)	
Annealed, 99.5% Fe.	36.75, ton deld. east of Mississippi.
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh)	58.0
Carbonyl Iron: 90-99.9%, 3 to 20 microns, depending on grade, 88.00-700.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 600-lb drum freight allowed, c.l. 39.80; ton lots	41.80
Brass, 80/20, leaded (60 mesh)	37.80
Bronze powder, 90/10.	55.80
Copper, all types	15.00*
Lead	7.50*
Manganese, 500 lb and up	25.00*
Nickel, all types	0.78-1.06
Nickel-Silver	54.70
Solder	7.00*
Stainless Steel, 304	89.00
Stainless Steel, 316	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc	23.20
Cobalt:	Dollars
98.5%, minus 100-300 mesh	1.57-1.58
99.5%, below 5 microns	2.32
Molybdenum	4.35

*Plus cost of metal. ‡Depending on mesh. §Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa. furnace	$14.75-15.25
Connellsville, Pa. foundry	18.00-18.50

Oven Foundry

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.80
Detroit, ovens	32.00
Pontiac, Mich., deld.	34.05
Saginaw, Mich., deld.	35.63
Erie, Pa., ovens	32.00
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.64
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
New Haven, Conn., ovens	31.00
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.45
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.78
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.60	$5.65	$5.55	$5.45	$5.75
Bar Size Angles	5.85	5.90	5.80	5.70	6.00
Structural Angles	5.65	5.70	5.60	5.50	5.80
I-Beams	5.60	5.65	5.55	5.45	5.75
Channels	5.60	5.65	5.55	5.45	5.75
Plates (basic bessemer)	5.55	5.60	5.50	5.40	5.70
Sheets, hot rolled and galvanized	Nom.	....	Nom.	Nom.	Nom.
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	23.90	23.95	23.85	23.55	25.30
Barbed Wire (†)	6.20	6.15	6.05	5.90	6.25
Merchant Bars	6.15	6.20	6.10	6.00	6.30
Hot-Rolled Bands	5.95	6.00	5.90	5.80	6.10
Wire Rods, Thomas No. 5 (Niederrhein)	5.80*	5.90	5.75	5.75	6.00
Wire Rods, O.H., No. 5 (Niederrhein)	6.00*	6.10	5.95	5.95	6.20
Bright Common Wire Nails (§)	7.15	7.20	7.10	7.00	7.30

†Per 82 lb net reel. §Per 100-lb keg, 20d nails and heavier. *Except Boston.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.

Pure benzene	34.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00

Cents per lb, f.o.b. tank cars or tank trucks, deld.

Phenol, 90 per cent grade	14.75

Per ton bulk, f.o.b. cars or trucks, plant.

Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton, Palmerton, Pa., 21-23% Mn, $102,50; 19-21% Mn, 1-3% Si, $100; 16-19% Mn, $98. For Neville Island, Pa., prices add $2.50. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Min 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3c for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot of 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload, 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.5c, ton 13.25c, less ton 14.25, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.2c from above prices. For 3% grade, Si 12.5-16% deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 5% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.27, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome: Cr 58-65%, C 5-7%, Si 4-6%, S 0.03% max, 20.00c per lb of contained Cr, carlots, lump, bulk, delivered.

Blocking Chrome: Cr 55-63%, C 4-6%, Si 8-12%, 23.50c per lb of contained Cr, delivered in carlots, lump, bulk.

Refined Chrome: Cr 58-65%, C 4.25% max., Si 1.0% max., S 0.03%, 21.00c per lb of contained Cr. carlots, lump, bulk, delivered.

Low-Carbon Ferrochrome: (Simplex) Cr 63-66% or 68-71%: C 0.025% max., 31.50c; C 0.010% max., 32.50c per lb of contained Cr, carlots, lump, bulk, delivered.

Cr 68-73%: C 0.25% max., 33.00c. Cr 65-71%; C 0.05% max., 32.00c; C 0.10% max., 31.75c; C 0.20% max., 31.50c; C 0.50% max, 31.25c; C 1.0% max., 31.00c; C 1.5%, 30.75c; C 2.0% max, 30.50c, carlots, lump, bulk, delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C. l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). 8M x D, carload, bulk, 20.05c per lb of alloy, carload packed 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max, 22.50c per lb contained Cr and 14.60c per lb contained Si; Cr 33-36%, Si 45-48%, C 0.05% max, 22.50c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, carlot packed, 2" x D plate (above ¼" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5 freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 13.5c per lb contained Si, Packed, c.l. 16.0c, ton lot 17.45c, less ton 19.1c f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Chattanooga, Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.7% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lots, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F. o. b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3½ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Spot, add 0.25c. ,

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l. packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.60 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). $5.25 per lb (all quantities) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 4% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 44-47% approx, Ta 15% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots, $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carload, bulk 19.25c per lb of alloy, c.l. packed ⅛ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

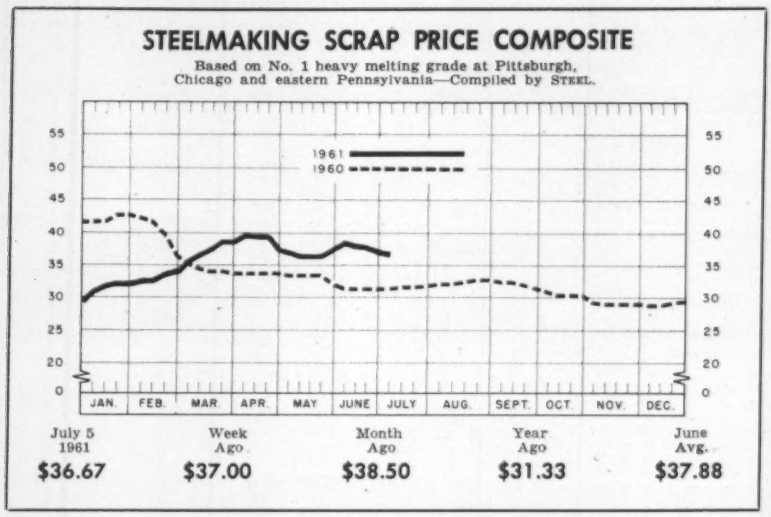
V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Siminal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk, 19.25c. Packed c.l. 20.25c; 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (65-70%). Per lb of contained Mo in 2000-lb container, f.o.b. Langeloth and Washington, Pa., $1.89 in all sizes except powdered which is $1.95.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans $1.60; in bags, $1.59, f.o.b. Langeloth and Washington, Pa.



Scrap Slips Fourth Straight Week

STEEL's index on No. 1 heavy melting grade declines another 33 cents a ton to $36.67 though market is largely untested by mill buying. Exports are still providing support

Scrap Prices, Page 114

• **Pittsburgh**—Prices of key grades of scrap are off about $1 a ton in a dull market. Little material is being generated. Brokers for a mill on the edge of the district offered dealers $36, delivered, for No. 1 heavy melting vs. $37 last month. It's believed consumers here could buy the prime grade for $36. The July list of No. 1 factory bundles from an automotive stamping plant went to brokers for more than $42, up $1 a ton.

• **Philadelphia** — Domestic scrap prices are slightly higher at $25-$26, delivered, for No. 2 bundles and $44 for electric furnace bundles. All other grades are unchanged, with foreign shipments moderately active.

• **New York** — Brokers' buying prices are unchanged. Domestic demand is dull, but the export movement is well sustained.

• **Chicago**—Weakness persists but prices are unchanged in an untested market. Winning bids on more than 14,000 tons of No. 1 factory bundles to be produced at two auto stamping plants this month ranged from $38.37 to $38.63 on track. Allowing for a $2.43 switching charge and $1 broker's commission, the mill delivered price would be $41.80 to $42.06. That's $1 a ton less than was bid a month ago, but equivalent to the $42 price now quoted. An important mill has announced $38 a ton as its July buying price for No. 1 industrial heavy melting it will accept as returns from its customers. That's a reduction of $2 a ton from the mill's June price, but is $1 higher than recent sales of that grade to other mills.

• **Cleveland**—Although buying is limited, the market is firmer. Traders anticipate a rise in prices on the steelmaking grades as result of higher bids on the July automotive lists. The strength in industrial scrap reflects shorter supplies this month due to curtailments as the 1961 model runs taper off.

• **Youngstown** — Some weakening of prices on the No. 2 steelmaking grades is noted here. Nominally No. 2 heavy melting is $24-$25 and No. 2 bundles $23-$24. The auto model changeovers and summer vacations are slowing the flow of scrap.

• **Detroit**—Prices are holding fairly steady following the closing of bids on the auto lists. Bids on Chrysler lists ranged from 50 cents to $1.25 a ton over those of a month ago, while bids on Fisher Body lists held steady. Lack of scrap explains the steadiness. A couple of small orders for scrap indicate the trend. A dock order for bundles with tight specifications, reportedly went at $37 on track. Great Lakes Steel put out a small order for bundles at $36.

• **Buffalo**—Local dealers are awaiting the placement of mill orders for July delivery. They anticipate only small tonnage demand for a few key grades. Prices are on the easy side as the result of local, representative mill buying. Demand for export, however, continues to provide market support.

• **Cincinnati**—A district mill is expected to close on a tonnage for July delivery, and this is serving to keep the market on a sidewise course. It's said the mill will pay the same prices as it did a month ago for the No. 1 grades. However, No. 2 heavy melting is off $1 a ton in the mill's new program, translating into a broker's quotation of $27.50-$28.50. No. 1 heavy melting continues $32-$33.

• **Seattle**—The market is firm. Domestic buying is reasonably active, but chief strength is being provided by exports.

• **St. Louis**—The market is quiet and the cast iron grades are noticeably weak. Little open hearth material is coming to dealers' yards, but that hasn't served to strengthen prices on that grade.

• **Birmingham**—The market is dull, and little activity is anticipated until the latter part of this month. Last week, random length rails advanced 50 cents a ton to $41-$42.

• **Houston**—Cast iron scrap prices appear to be weakening, based on quotations prevailing on a recent purchase of cupola and unstripped motor grades. Major dealers are quoting $38-$39 on cupola cast and $31-$32 on unstripped motor blocks.

• **Portland, Oreg.**—Traders expect current prices to hold the rest of this month. Exports are more active than domestic requirements.

(*Please turn to Page* 119)

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, July 5, 1961. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

July 5	$36.67
June 28	37.00
June Avg.	37.88
July 1960	31.63
July 1956	47.70

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*35.00-36.00*
No. 2 heavy melting	*28.00-29.00*
No. 1 dealer bundles	*36.00-37.00*
No. 2 bundles	*23.00-24.00*
No. 1 busheling	*35.00-36.00*
No. 1 factory bundles	*43.00-44.00*
Machine shop turnings	14.00-15.00
Mixed borings, turnings	14.00-15.00
Short turnings	19.00-20.00
Cast iron borings	18.00-19.00
Cut structurals:	
2 ft and under	40.00-41.00
3 ft and under	37.00-38.00
Heavy turnings	27.00-28.00
Punching & plate scrap	41.00-42.00
Electric furnace bundles	*44.00-45.00*

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	34.00-35.00
Stove plate	34.00-35.00
Unstripped motor blocks	24.00-25.00
Clean auto cast	35.00-36.00
Drop broken machinery	45.00-46.00‡

Railroad Scrap

No. 1 R.R. heavy melt.	39.00-40.00
Rails, 2 ft and under	50.00-51.00
Rails, 18 in. and under	51.00-52.00
Random rails	46.00-47.00
Angles, splice bars	45.00-46.00
Railroad specialties	42.00-43.00
Rails, rerolling	59.00-60.00

Stainless Steel Scrap

18-8 bundles & solids	180.00-185.00
18-8 turnings	105.00-110.00
430 bundles & solids	85.00-90.00
410 turnings	50.00-55.00

CHICAGO

No. 1 hvy melt., indus.	36.00-37.00
No. 1 hvy. melt., dealer	34.00-35.00
No. 2 hvy. melting	30.00-31.00
No. 1 factory bundles	41.00-42.00
No. 1 dealer bundles	36.00-37.00
No. 2 bundles	21.00-22.00
No. 1 busheling, indus.	36.00-37.00
No. 1 busheling, dealer	34.00-35.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	17.00-18.00
Shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Cut structurals, 3 ft	42.00-43.00
Punchings & plate scrap	43.00-44.00

Cast Iron Grades

No. 1 cupola	41.00-42.00
Stove plate	36.00-37.00
Unstripped motor blocks	33.00-34.00
Clean auto cast	46.00-47.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R. R. heavy melt.	38.00-39.00
R.R. malleable	47.00-48.00
Rails, 2 ft and under	49.00-50.00
Rails, 18 in. and under	50.00-51.00
Angles, splice bars	44.00-45.00
Axles	56.00-57.00
Rails, rerolling	58.00-59.00

Stainless Steel Scrap

18-8 bundles, solids	185.00-190.00
18-8 turnings	105.00-110.00
430 bundles & solids	90.00-95.00
430 turnings	50.00-55.00

BUFFALO

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	26.00-27.00
No. 1 bundles	31.00-32.00
No. 2 bundles	24.00-25.00
No. 1 busheling	31.00-32.00
Shovel turnings	17.00-18.00
Machine shop turnings	13.00-14.00
Cast iron borings	15.00-16.00
Low phos. structurals and plates, 2 ft and under	39.00-40.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	37.00-38.00
No. 1 machinery	44.00-45.00

Railroad Scrap

Rails, random lengths	42.00-43.00
Rails, 3 ft and under	48.00-49.00
Railroad specialties	41.00-42.00
Rails, rerolling	62.00-63.00

CLEVELAND

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	24.00-25.00†
No. 1 factory bundles	41.00-42.00
No. 1 bundles	35.00-36.00
No. 2 bundles	23.00-24.00†
No. 1 busheling	35.00-36.00
Machine shop turnings	12.00-13.00
Shovel turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut foundry steel	30.00-33.00
Cut structurals, plate, 2 ft and under	39.00-40.00
Low phos, punchings & plate	37.00-38.00
Alloy free, short shovel turnings	18.00-19.00
Electric furnace bundles	37.00-38.00

Cast Iron Grades

No. 1 cupola	39.00-40.00
Charging box cast	26.00-27.00
Heavy breakable cast	28.00-29.00
Stove plate	36.00-37.00
Unstripped motor blocks	31.00-32.00
Brake shoes	37.00-38.00
Clean auto cast	47.00-48.00
Burnt cast	32.00-33.00
Drop broken machinery	48.00-49.00

Railroad Scrap

R.R. malleable	47.00-48.00
Rails, 2 ft and under	48.00-49.00
Rails, random lengths	44.00-45.00
Rails, 18 in. and under	49.00-50.00
Cast Steel	41.00-42.00
No. 1 railroad cast	48.00-49.00
Railroad specialties	43.00-44.00
Angles, splice bars	46.00-47.00
Rails, rerolling	55.00-56.00

Stainless Steel Scrap
(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	160.00-165.00
18-8 turnings	95.00-100.00
430 clips, bundles, solids	80.00-85.00
430 turnings	15.00-25.00†

YOUNGSTOWN

No. 1 heavy melting	38.00-39.00
No. 2 heavy melting	25.00-26.00†
No. 1 busheling	38.00-39.00
No. 1 bundles	39.00-40.00
No. 2 bundles	25.00-26.00†
Machine shop turnings	14.00-15.00†
Shovel turnings	19.00-20.00†
Cast iron borings	19.00-20.00†
Low phos.	40.00-41.00
Electric furnace bundles	40.00-41.00

Railroad Scrap

No. 1 R.R. heavy melt.	40.00-41.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	*27.50-28.50*
No. 1 bundles	33.00-34.00
No. 2 bundles	20.00-21.00
No. 1 busheling	32.00-33.00
Machine shop turnings	9.00-10.00
Mixed borings, turnings	11.00-12.00
Shovel turnings	12.00-13.00
Cast iron borings	11.00-12.00
Low phos. 18 in.	39.00-40.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Heavy breakable cast.	28.00-29.00
Charging box cast	34.00-35.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	36.00-37.00
Rails, 18 in. and under	47.00-48.00
Rails, random lengths	41.00-42.00

ST. LOUIS (Brokers' buying prices)

No. 1 heavy melting	34.00
No. 2 heavy melting	28.00
No. 1 bundles	34.00
No. 2 bundles	24.00
No. 1 busheling	34.00
Machine shop turnings	13.00
Shovel turnings	16.00

Cast Iron Grades

No. 1 cupola	37.00
Charging box cast	34.00
Heavy breakable cast	32.00
Unstripped motor blocks	34.00
Clean auto cast	38.00
Stove plate	*32.00*

Railroad Scrap

No. 1 R.R. heavy melt.	34.00
Rails, random lengths	37.00
Rails, rerolling	52.00-53.00
Rails, 18 in. and under	43.00
Angles, splice bars	40.00†

PHILADELPHIA

No. 1 heavy melting	39.00
No. 2 heavy melting	35.00
No. 1 bundles	43.00
No. 2 bundles	*25.00-26.00*
No. 1 busheling	43.00
Electric furnace bundles	*44.00*
Mixed borings, turnings	17.00†
Shovel turnings	20.00
Machine shop turnings	14.00
Heavy turnings	25.00†
Structurals & plates	43.00-44.00
Couplers, springs, wheels	43.00
Rail crops, 2 ft & under	51.00-53.00

Cast Iron Grades

No. 1 cupola	40.00
Heavy breakable cast	40.00
Drop broken machinery	49.00-50.00†
Malleable	49.00†

NEW YORK (Brokers' buying prices)

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	23.00-24.00
No. 1 bundles	30.00-31.00
No. 2 bundles	20.00-21.00
Machine shop turnings	5.50-6.00†
Mixed borings, turnings	6.00-6.50†
Shovel turnings	7.00-8.00†
Low phos. structurals & plates	32.00-33.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	31.00-32.00

Stainless Steel

18-8 sheets, clips, solids	155.00-160.00
18-8 borings, turnings	70.00-75.00
410 sheets, clips, solids	40.00-45.00
430 sheets, clips, solids	55.00-60.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	28.50-29.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	28.00-29.00
No. 1 busheling	28.50-29.00
Machine shop turnings	5.00-6.00
Shovel turnings	9.00-9.50
No. 1 cast	39.00-40.00
Mixed cupola cast	32.00-33.00
No. 1 machinery cast	40.00-42.00

DETROIT (Brokers' buying prices)

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	35.00-36.00
No. 2 bundles	23.00-24.00
No. 1 busheling	31.00-32.00
Machine shop turnings	10.00-11.00
Mixed borings, turnings	11.00-12.00
Shovel turnings	12.00-13.00

Cast Iron Grades

No. 1 cupola	32.00-33.00
Mixed cast	30.00-31.00
Stove plate	27.00-28.00
Heavy breakable	26.00-27.00
Unstripped motor blocks	22.00-23.00
Clean auto cast	39.00-40.00

Stainless Steel Scrap

18-8 bundles & solids	170.00-175.00
18-8 turnings	70.00-75.00
430 bundles & solids	70.00-75.00
430 turnings	11.00-12.00

BIRMINGHAM

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	29.00-30.00
No. 1 bundles	36.00-37.00
No. 2 bundles	20.00-21.00
No. 1 busheling	38.00-39.00
Cast iron borings	10.00-11.00
Machine shop turnings	18.00-19.00
Shovel turnings	20.00-21.00
Bar crops and plates	43.00-44.00
Structurals & plate	42.00-43.00
Electric furnace bundles	38.00-39.00
Electric furnace:	
3 ft and under	36.00-37.00
2 ft and under	37.00-38.00

Cast Iron Grades

No. 1 cupola	42.00-43.00
Stove plate	42.00-43.00
Unstripped motor blocks	31.00-32.00
No. 1 wheels	34.00-35.00

Railroad Scrap

No. 1 R.R. heavy melt.	38.00-39.00
Rails, 2 ft and under	46.00-47.00
Rails, random lengths	*41.00-42.00*
Angles, splice bars	44.00-45.00

HOUSTON

(Brokers' buying prices; f.o.b. car)

No. 1 heavy melting	35.00
No. 2 heavy melting	31.00-32.00
No. 1 bundles	35.00-36.00
No. 2 bundles	23.00-24.00
Machine shop turnings	11.00-12.00
Low phos. plate & structurals:	
3 ft	40.00
2 ft and under	45.00-46.00

Cast Iron Grades

No. 1 cupola	38.00-39.00
Heavy breakable	26.00-27.00
Foundry malleable	30.00-31.00
Unstripped motor blocks	31.00-32.00

Railroad Scrap

R.R. heavy melt. (3 ft)	37.00-38.00

LOS ANGELES

No. 1 heavy melting	40.00-42.00
No. 2 heavy melting	39.00
No. 1 bundles	40.00
No. 2 bundles	26.00
No. 2 bundles (export)	27.00-28.00
Machine shop turnings	15.00-17.00
Shovel turnings	15.00-17.00
Cast iron borings	16.00-17.00
Cut structurals and plate 1 ft and under	50.00

Cast Iron Grades

No. 1 cupola	44.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	42.00

PORTLAND, OREG.

(Prepared, f.o.b. car)

No. 1 heavy melting	44.00-45.00
No. 2 heavy melting	41.00-42.00
No. 2 bundles	31.00
Shovel turnings	18.00
Electric furnace	54.00

Cast Iron Grades

No. 1 cupola	42.00
Heavy breakable	38.00
Unstripped motor blocks	39.00
Stove plate (f.o.b. plant)	37.00

SEATTLE (Prepared, f.o.b. car)

No. 1 heavy melting	44.00-45.00
No. 1 hvy (unprepared)	39.00
No. 2 heavy melting	41.00-42.00
No. 2 hvy (unprepared)	36.00
No. 2 bundles	31.00
Shovel turnings	16.00-18.00
Electric furnace	52.00

Cast Iron Grades

No. 1 cupola	42.00
Heavy breakable cast.	39.00
Stove plate (f.o.b. plant)	37.00
Unstripped motor blocks	39.00

SAN FRANCISCO

No. 1 heavy melting	44.00**
No. 2 heavy melting	41.00**
No. 1 bundles	34.00**
No. 2 bundles	28.00**
Machine shop turnings	18.00
Mixed borings, turnings	18.00
Cast iron borings	18.00
Heavy turnings	18.00
Shovel turnings	18.00

Cast Iron Grades

No. 1 cupola	46.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast.	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	45.00-46.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices; net tons)

No. 1 heavy melting	31.00
No. 2 hvy melt, 2 ft & under	29.00
No. 1 bundles	31.00
No. 2 bundles	21.00
Mixed steel scrap	23.00
Mixed borings, turnings	12.00
Busheling, new factory:	
Prepared	31.00
Unprepared	25.00
Shovel turnings	12.00

Cast Iron Grades‡

No. 1 machinery cast.	32.00

**Based mainly on export sales.
†Nominal.
‡F.o.b. Hamilton, Ont.
§Delivered.

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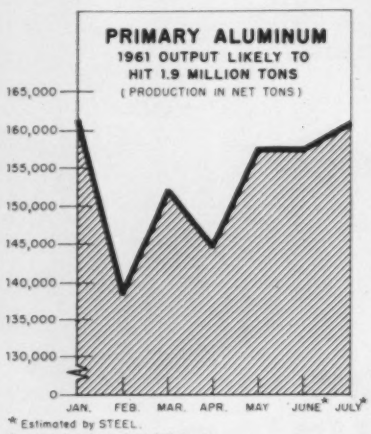
Is Aluminum Price Hike Shaping Up?

Nonferrous Metal Prices, Pages 118 & 119

THE QUESTION: Should aluminum prices be hiked after wage increases go into effect later this summer? is being mulled at the top level in the industry these days, but no hint of an answer has been leaked, if one has been formulated. Even the usual trial balloons are missing.

• **Pressures Are Great**—Look at these facts: The present ingot price of 26 cents a pound has been in effect since Dec. 17, 1959 (the boost then was 1.3 cents a pound). The price today is exactly what it was in 1957. Yet, since 1957, labor costs alone have gone up 66.63 cents an hour. On Aug. 1, labor expenses will go up 11.87 cents an hour—the last installment on a three year contract that became effective Aug. 1, 1959. Total cost of the three year package is 34.6 cents an hour in wages and fringes, including cost-of-living payments. Other costs are up too. Costs and intense competition have put the squeeze on profits.

Last year, net income of the three major U. S. primary producers (Alcoa, Reynolds, Kaiser) averaged around 5 per cent on sales. That compares with net income to sales of 9.3 per cent for motor vehicles, 8.5 per cent for chemicals, and 7.6 per cent for petroleum refining, says Kaiser's president, D. A. Rhodes. Even more significant is aluminum's low return on investment. In 1960, net returns of the Big Three averaged between 2.8 and 2.9 per cent. Comparisons: All primary nonferrous metals, 4.9 per cent; primary iron and steel, 5 per cent; motor vehicles, 9.3 per cent; electrical machinery, 5.8 per cent; chemicals, 8.5 per cent; and petroleum refining, 7.6 per cent.



The industry feels it needs a better return on sales and investment, not only to pay the rent, creditors, and stockholders, but to build markets.

• **Against a Hike**—Why would producers hesitate to raise prices? Simply because competition within the industry, and from competing materials, has never been more intense. The ingot price, at 26 cents a pound, has been pretty well maintained, but this is about the only product category. Price cutting, both official and unofficial, has been widespread. Late in June, the price of extrusion billets was cut 1.1 cents a pound, for example. Even more recently, the price of can stock was trimmed about 9 per cent.

The question facing aluminum men is: Would the market stand a price hike at this time, considering the weakness in mill product quotations?

It's a safe bet independent fabricators would be quite unhappy if the price went up.

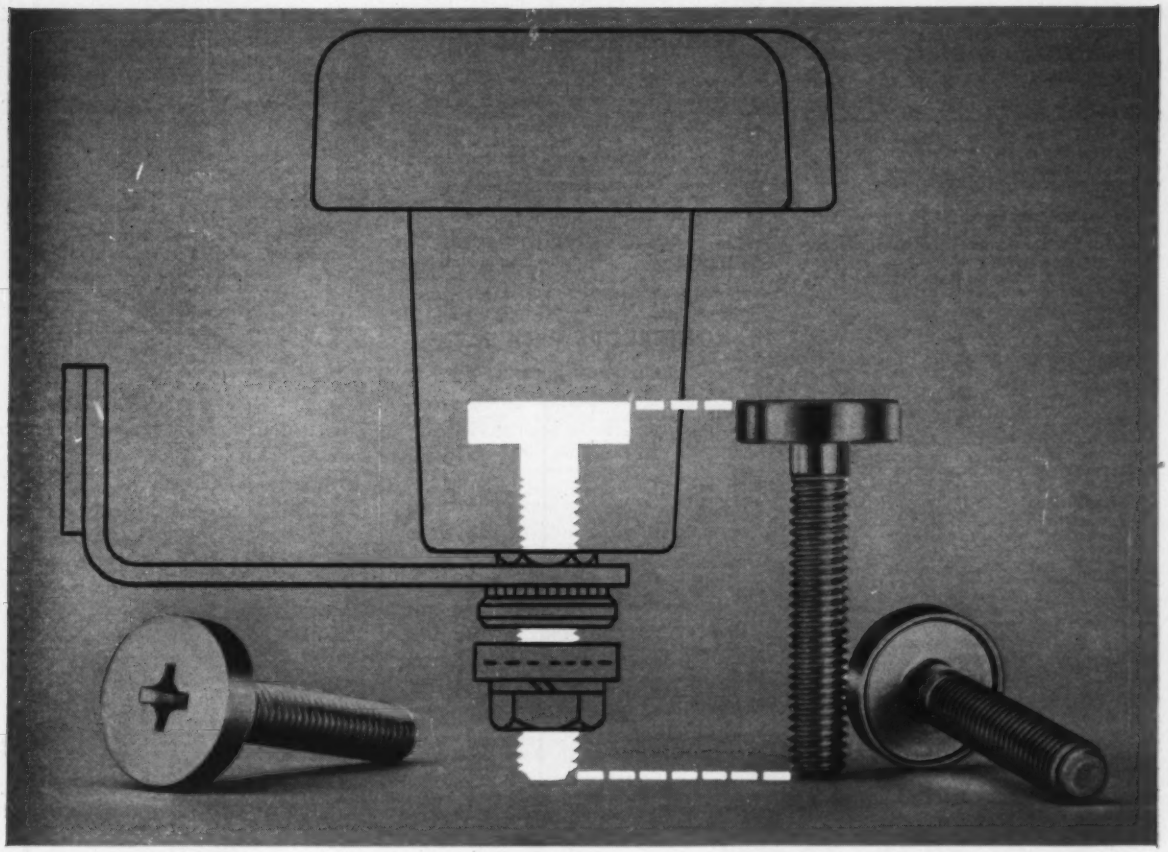
The key to a price advance probably rests with how well sales do. They've been going up, but not as fast as some industry sources had predicted. Through May, shipments of sheets and plates (the largest aluminum category) totaled 300,157 tons compared with 286,496 tons in the same period last year. Foil shipments through May were 49,327 tons vs. 46,721 tons in the like period of 1960.

Observers believe that if a price hike does come, it will be in the fourth quarter rather than soon after the Aug. 1 wage increases. They point out that sales probably won't be too brisk for a couple of months because of the traditional summer letdown. But by the fourth quarter producers will have a pretty good idea of sales for the year. Should some hikes come in steel (see Page 35) they might provide aluminum producers additional incentive to think in terms of higher prices for their products. Also keep an eye on the international situation—a tightening of tension would certainly have a bullish effect. As the situation stands now, odds are that any hike would be modest—say about 1 cent a pound for ingots.

NONFERROUS PRICE RECORD

	July 5 Price	Last Change	Previous Price	June Avg	May Avg	July, 1960 Avg
Aluminum	26.00	Dec. 17, 1959	24.70	26.000	26.000	26.000
Copper	31.00	May 19, 1961	30.50	31.000	30.423	33.000
Lead	10.80	Dec. 13, 1960	11.80	10.800	10.800	11.800
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	81.25	June 30, 1961	74.00	74.277	74.000	74.000
Tin	117.75	July 5, 1961	116.125	111.11	114.625	103.565
Zinc	11.50	Jan. 9, 1961	12.000	11.500	11.500	13.000

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, East St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingot, 99.5+%, f.o.b. customer custody; MAGNESIUM, pig, 99.8%, Velasco, Tex.



CUNISIL, new Anaconda copper-nickel-silicon alloy, gives you high strength for tough electrical jobs

THE PROBLEM: The studs for Line Materials Secondary Class Lightning Arresters (illustration above and below left) call for an unusual combination of properties. They must have high physical strength for structural reasons and to handle the stresses of high surge currents. Yet they must also have relatively high electrical conductivity. And for economical fabrication, the alloy must have good cold-forming characteristics and be readily machinable.

LINE MATERIALS Type S-3 Secondary Class Arrester with stud of Cunisil, copper-nickel-silicon alloy. Cunisil is also used for lower studs of Line Materials Protective Gaps.

THE SOLUTION: Continental Screw Company, which makes the studs for Line Material Industries, found the answer in Cunisil-837, Anaconda's versatile new high-strength, heat-treatable alloy with these valuable properties in the precipitation-hardened condition:

Tensile strength—psi min.	90,000
Yield strength—at .50% extension under load, psi min.	70,000
Elongation in 4 x D, min.	8%
Machinability, (Free Cutting Brass=100)	40
Electrical Conductivity, % IACS, as heat treated	30 to 42

In addition, Cunisil-837 has corrosion resistance comparable to copper and Everdur® copper-silicon alloys—and is easy to work cold before heat treatment.

METALLURGICAL COMMENT. Most of the nickel and silicon in heat-treated Cunisil is present as an intermetallic compound, nickel silicide, and it is the precipitation of nickel silicide in the form of particles of submicroscopic size by a relatively low temperature heat treatment that accounts largely for the distinctive properties of the alloy.

Prior to the hardening heat treatment, the alloy is brought to a proper condition for hardening with a solution anneal at a much higher temperature and then a water quench from this temperature; at this stage the alloy is quite soft and in a condition for drastic cold-working operations. The hardening heat treatment consists of heating at a controlled temperature for a definite length of time to obtain the desired mechanical properties.

For more information—see your Anaconda American Brass representative, or write: Anaconda American Brass Co., Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont. 6149

ANACONDA®

COPPER AND COPPER ALLOY MILL PRODUCTS

Anaconda American Brass Company

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, 50 lb ingots, 26.00, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.90; No. 43, 26.20; No. 195, 27.60; No. 214, 29.00; No. 356, 26.80, 50 lb ingots.

Antimony: R.M.M. brand, 95.5%, 32.50; Lone Star brand, 33.00, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 30.50-31.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $70.00 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg; $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $55 per lb and up nom.

Copper: Electrolytic, 31.00 deld.; custom smelters, 31.00 nom.; lake, 31.00 deld.; fire refined, 30.75 deld.

Germanium: First reduction, ingots, less than 1 kg 36.00-37.50 per gram; 1-10 kg 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intrinsic grade, under 10 kg 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 10.80; chemical, 10.90; corroding, 10.90; St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb deld.; 24-90 lb, $9.50; 100-499 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75 f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $197-200 per 76 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-8.5 in. diam., 50-4999 lb, $8.15 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, briquettes, sheets (4 x 4 in. and larger), unpacked, 81.25; 10-lb pigs, unpacked, 89.00; "XX" nickel shot, 88.75; "F" nickel shot for addition to cast iron, in kegs, 81.75; "F" nickel, 5 lb ingots, 82.75. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.09; Exton, Pa., basis, add 1.60. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel 77.50.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $6.50-7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; 5 and 12 lb bricks, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $5.25 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 117.75.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 100-lb lots, $2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00c; 99+% hydrogen reduced, $3.10-4.00.

Zinc: Prime Western, 11.50; brass special 11.70; intermediate, 11.70, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.35; special high grade, 12.50 deld. Diecasting alloy ingot No. 3, 13.75; No. 2, 14.25; No. 5, 14.00 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8-8.50 per lb; 100-500 lb, $7.25-7.50 per lb; 500-1000 lb, $6.50-7.25; over 1000 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 24.25-26.00; No. 12 foundry alloy (No. 2 grade), 21.75-22.25; 5% silicon alloy, 0.60 Cu max, 23.50-24.00; 13 alloy, 0.60 Cu max, 23.50-24.00; 195 alloy, 24.75-25.75; 108 alloy, 22.25-22.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.25; grade 2, 22.00; grade 3, 21.00; grade 4, 20.00.

Brass Ingot: Red brass, No. 115, 32.00; tin bronze, No. 225, 41.25; No. 245, 35.75; high leaded tin bronze, No. 305, 36.00; No. 1 yellow, No. 405, 27.50; manganese bronze, No. 421, 31.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.955, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 36.35; l.c.l., 36.98. Weatherproof, 20,000-lb lots, 37.05; l.c.l., 37.80.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $16.50 per cwt; pipe, full coils, $16.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $3.80-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $14.00-25.00; H.R. strip, $14.00-22.90; C.R. strip, $16.00-35.00; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	147	126	145
Strip, C.R.	133	114	145
Plate, H.R.	134	116	133
Rod, Shapes, H.R.	116	95	116
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.40-48.00
0.136-0.096	24-72	72-180	45.90-48.80
0.096-0.077	24-72	72-180	46.40-50.30
0.077-0.068	24-72	72-180	46.90-52.10
0.068-0.061	24-72	72-180	46.90-55.00
0.061-0.048	24-72	72-180	47.40-57.70
0.048-0.038	24-72	72-180	47.90-60.50
0.038-0.030	24-72	72-180	48.40-65.30
0.030-0.024	24-72	72-180	48.90-67.20
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-144	54.60
0.011-0.0095	24-46	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and Circles: Thickness, 0.25-3 in.; width or diam. 24-60 in.; length, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100, 3003-F	44.60	50.90
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4*	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 base, 12 ft lengths.

Diam (in.)*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	74.90	77.30	....	....
0.188	63.20	63.20	....	80.10
0.250	60.00	62.60	72.70	74.10
0.375	59.20	63.80	71.00	72.00
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	59.20	63.80	71.00	72.00
0.625	59.20	63.80	67.80	67.90
0.750	57.70	62.00	61.60	63.80
0.875	57.70	62.00	61.60	63.80
1.000	57.70	62.00	61.60	63.80
1.125	55.30	59.50	59.50	61.50
1.250	55.30	59.50	59.50	61.50
1.375	55.30	59.50	59.50	61.50
1.500	55.30	59.50	59.50	61.50
1.625	53.00	56.70	....	59.30
1.750	53.00	56.70	58.30	59.30
1.875	53.00	56.70	....	59.30
2.000	53.00	56.70	58.30	59.30
2.250	51.50	55.00	....	59.30
2.500	51.50	55.00	....	59.30
2.750	49.90	53.20	....	59.30
3.000	49.00	53.20	....	59.30
3.250	....	53.20	....	....
3.375	....	53.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random length, diam., 0.375-8 in., "F" temper; 2014, 47.50-57.60; 6061, 43.50-57.60; 7075, 61.80-71.90; 7079, 66.80-76.90.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 32.00; 1¼ in., 43.40; 1½ in., 51.80; 2 in., 62.60; 3 in., 124.95; 4 in., 171.80; 5 in., 233.15; 6 in., 308.55; 8 in., 464.35; 10 in., 716.25 (3-24 ft lengths).

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	45.30-46.80	54.00-60.00
15-17	45.30-46.80	56.50-61.80
18-23	45.80-47.50	58.60-67.00
24-32	45.80-47.50	66.80-81.50
33-38	49.50-52.20	85.10-96.60
39-44	59.80-63.60	102.00-124.00

MAGNESIUM

Sheets and Plates: AZ31B standard grades, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; 188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24.72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grades (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 23.50-24.00; No. 2 heavy copper and wire, 23.50-29.00; light copper 20.00-20.50; No. 1 composition red brass, 20.50-21.00; No. 1

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES d (Based on copper at 31.00c)		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	56.13b	50.61–51.36	....	57.32	27.00	27.00	26.25
Yellow Brass	49.27	35.77c	49.56	53.43	20.375	19.50c	18.50c
Low Brass, 80%	52.15	52.09	52.44	56.21	22.875	22.625	22.125
Red Brass, 85%	53.17	53.11	53.46	57.23	23.875	23.625	23.125
Com. Bronze, 90%	54.73	54.67	55.02	58.54	24.75	24.50	24.00
Manganese Bronze	57.71	51.27	61.54	....	19.25	19.00	18.25
Muntz Metal	51.94	47.25	....	....	19.125	18.875	18.375
Naval Brass	53.94	47.75	60.25	58.10	19.00	18.75	18.25
Silicon Bronze	61.39	60.58	60.68	79.80	26.375	26.125	25.375
Nickel Silver, 10%	64.83	67.16	66.91	....	25.25	25.00	12.625
Phos. Bronze, A-5%	76.97	77.47	76.72	78.90	28.50	28.25	27.25

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Free cutting. d. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time of any or all kinds of scrap, add 1 cent per lb.

composition turnings, 19.50-20.00; new brass clippings, 18.00-18.50; light brass, 15.00-15.50; heavy yellow brass, 15.50-16.00; new brass rod ends, 17.00-17.50; auto radiators, unsweated, 16.50-17.00; cocks and faucets, 17.25-17.75; brass pipe, 17.50-18.00.

Lead: Soft scrap lead, 7.25-7.50; battery plates, 3.00-3.25; linotype and stereotype, 8.50-8.75; electrotype, 8.00-8.25; mixed babbitt, 10.00-10.50.

Monel: Clippings, 26.00-26.50; old sheets, 25.00-25.50; turnings, 18.50-19.00; rods, 25.00-25.50.

Nickel: Sheets and clips, 56.00-58.00; rolled anodes, 56.00-58.00; turnings, 43.00; rod ends, 56.00-58.00.

Zinc: Old zinc, 3.00-3.25; new diecast scrap, 3.00-3.50; old diecast scrap, 1.75-2.00.

Aluminum: Old castings and sheets, 8.75-9.25; clean borings and turnings, 4.00-4.50; segregated low copper clips, 10.75-11.25; segregated high copper clips, 9.75-10.25; mixed low copper clips, 10.25-10.75; mixed high copper clips, 9.75-10.25.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 9.50-10.00; clean borings and turnings, 7.00-7.50; segregated low copper clips, 14.50-15.00; segregated high copper clips, 13.00-13.50; mixed low copper clips, 12.50-13.00; mixed high copper clips, 12.00-12.50.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 10.50; clean borings and turnings, 8.50-9.00; segregated low copper clips, 13.50; segregated high copper clips, 13.00; mixed low copper clips, 13.00; mixed high copper clips, 12.50-13.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)
Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 57.00; light scrap, 52.00; turnings and borings, 37.00.

Copper and Brass: No. 1 heavy copper and wire, 28.00; No. 2 heavy copper and wire, 25.75; light copper, 23.50; refinery brass (60% copper) dry copper content, 24.50-24.75.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 28.00; No. 2 heavy copper and wire, 25.75; light copper, 23.75; No. 1 composition borings, 23.00; No. 1 composition solids, 23.50; heavy yellow brass solids, 18.50; yellow brass turnings, 16.00; radiators, 19.00.

Plating Material

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.60.

Copper: Flat-rolled, 47.50; oval, 44.50; electrodeposited, 37.50; cast, 42.50; 5000-10,000 lb quantities.

Nickel: Depolarized, less than 500 lb, 109.00; 500-1999 lb, 102.00; 2000-4999 lb, 98.50; 5000-29,999 lb, 97.50; 30,000 lb, 96.50. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 134.50; 200-499 lb, 133.00; 500-999 lb, 132.50; 1000 lb or more, 132.00.

Zinc: Balls, 18.25; flat tops, 18.25; flats, 21.00; ovals, 20.25, ton lots.

CHEMICALS

Cadmium Oxide: $1.60 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 15.50; 2000-5900 lb, 13.50; 6000-11,900 lb, 13.25; 12,000-22,900 lb, 13.00; 23,000 lb or more, 12.50.

Nickel-Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 500-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-900 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 86.50; 100-600 lb, 76.80; 700-1900 lb, 74.10; 2000-9900 lb, 72.20; 10,000 lb or more, 70.90.

Stannous Chloride (Anhydrous): 100 lb, 144.80; 400 lb, 134.80; 800-19,900 lb, 113.50; 20,000 lb or more, 109.30.

Stannous Sulphate: Less than 50 lb, 152.20; 50 lb, 120.20; 100-1900 lb, 120.20; 2000 lb or more, 118.20.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

Nickel Price Rises

Nickel, the most stable pricewise of the major nonferrous metals, finally gave in to cost pressures June 30. International Nickel Co. of Canada Ltd. boosted the price 7.25 cents to 81.25 cents a pound. This was the first increase since it was moved to 74 cents a pound Dec. 6, 1956. The new price includes 1.24 cents a pound import duty.

Inco says the move is necessary because the company has absorbed mounting costs of all kinds in the last 4½ years and cannot continue to do so. In Canada alone, the nickel producer has absorbed more than $50 million in cost increases. "The company cannot continue to absorb mounting cost increases of the magnitude it has been carrying which have greatly exceeded the benefits of efficiencies and increases in productivity brought about by . . . research and more efficient capital installations," Inco declared.

Scrap . . .

(*Concluded from Page* 113)

Continued near term activity is indicated. A full cargo for Japan is being loaded here, and another of 9500 tons is also scheduled this month.

• Los Angeles—Some dealers anticipate price weakness to develop this month. A few are predicting a drop of $2 a ton on No. 1 heavy melting, No. 2 heavy melting, and No. 1 bundles.

• San Francisco—Dealers say prices are "all over the lot," but $44 still seems to be holding on No. 1 heavy melting steel for export. Until the domestic mills return to the market, it's expected prices will be erratic.

Purchased Scrap Use in April Best in 11 Months

Purchased scrap consumption in April amounted to about 1,966,000 gross tons, the highest monthly total since May, 1960, and the third straight monthly increase this year, reports the Institute of Scrap Iron & Steel Inc., Washington. The figures bear out the institute's earlier prediction that a gradual upswing in purchased scrap use would accompany improvement in steel operations.

The proportions of scrap and pig iron used in furnace charges were unchanged for the eighth straight month—52 per cent scrap and 48 per cent pig iron.

Steel mills stocks of home and purchased scrap declined for the tenth straight month during April. At the end of that month, the total was 6,241,000 tons, the lowest in

CLASSIFIED

Help Wanted

CHIEF STRUCTURAL STEEL DETAILER

Large midwest structural steel fabricator needs a man well qualified in heavy structural steel detailing to supervise the making of shop drawings by outside engineering companies, and to assume responsibility and handle operation of small drafting room. The man we employ must be thoroughly familiar with good shop practice and must have a record of reliable and dependable service. Organizational and administrative ability along with a pleasant personality is a must. A Civil Engineering education in structures would be helpful, but not necessary. Excellent, above average, salary is supplemented by many company benefits. Please furnish a resume, which includes education, marital status, employment record, a recent photograph and salary requirements.

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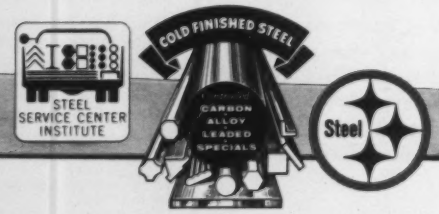

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WYCKOFF STEEL PRODUCTS • Carbon, Alloy and Leaded Steels • Turned and Polished Shafting • Turned and Ground Shafting • Large Squares • Wide Flats up to 12¾" x 2¼" and 14" x 1¼" • All types of Furnace Treated Steels including Carbon Corrected Steels

16 months, and down from the March total of 6,536,000.

Structural Shapes . . .

Structural Shape Prices, Page 103

The placing of a contract for 44,000 tons of structurals for the Verrazano-Narrows Bridge, New York, with the American Bridge Div., Pittsburgh, U. S. Steel Corp., is outstanding in a fairly active market. This is being built by the Triborough Bridge & Tunnel Authority, and the award represents the final major steel commitment for the project, which will require a total of about 150,000 tons (see structural placed column, Page 120).

Another large recent booking is the $803,657 structural contract placed with Ingalls Iron Works Co., Birmingham, by the Tennessee Valley Authority for its Paradise steam plant in Kentucky.

Another award includes 20,500 tons for the Hilton Hotel, 53rd Street and Avenue of the Americas, New York. The award by Uris Bros., New York, went to Bethlehem Steel.

Fabricated structural orders in general are holding up fairly well. They are trickling into fabricating shops at a steady rate.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

44,000 tons, suspended structure, Verrazano-Narrows Bridge, New York, for Triborough Bridge & Tunnel Authority, to American Bridge Div., Pittsburgh, U. S. Steel Corp.; This is the final major award for a project that will require approximately 150,000 tons. Previous awards include: 26,500 tons for one of two towers, to Bethlehem Steel Co., Bethlehem, Pa., and 26,500 tons to Harris Structural Steel Co., New York, for the second; and, 10,885 tons of cable anchorage metal work, awarded early last summer to Sun Shipbuilding & Dry Dock Co., Chester, Pa.

20,500 tons, Hilton Hotel, New York, through Uris Bros., New York, to Bethlehem Steel Co., Bethlehem, Pa.

900 tons, transmission towers for Bonneville Power Administration, Portland, Oreg., to Societa Anonima Elettrificazione, Milan, Italy, low at $269,482.

7000 tons, tainter gates and appurtenances for the John Day Dam, to Consolidated Western Steel Corp., Seattle.

1800 tons, Passagassawaukeag River bridge, Belfast, Maine, to Bancroft & Martin Rolling Mills Co., South Portland, Maine; Ellis C. Snodgrass, Inc., Portland, general contractor; also 585 tons, steel piles, to same fabricating shop.

1275 tons, cable plant, Western Electric Co., Baltimore, to Bethlehem Fabricators, Bethlehem, Pa.

1185 tons, service center, American Red Cross, 57th Street, and Avenue of the Americas, New York, to Bethlehem Steel Co., Bethlehem, Pa.

730 tons, Princeton Club, 15-21 W. 43rd St., New York, to Bergen Iron Works, Carlstadt, N. J.

450 tons, National Aeronautics & Space Administration, Payload Test Center No. 7, Greenbelt, Md., through United Engineers

& Constructors, Philadelphia, to Belmont Iron Works, Eddystone, Pa.

383 tons, four span, composite wide flange beam bridge, South Burlington, Vt., I-89—3 (12), to Vermont Structural Steel Co., Burlington; E. T. O'Neill & Son Construction Corp., Westfield, Mass., general contractor.

STRUCTURAL STEEL PENDING

1617 tons, state bridgework, Route 80, Sec. 5P, Bergen County, New Jersey; bids Aug. 9; also required, 560 tons of reinforcing bars.

750 tons, electric furnace building, Lukens Steel Co., Coatesville, Pa.; bids July 20 through United Engineers & Constructors, Philadelphia.

630 tons, pickling building, Claymont, Del., for Phoenix Steel Corp.; bids asked.

600 tons, building, East Windsor, N. J., for McGraw-Hill Co.; bids July 24.

459 tons, office, New Jersey State Department of Education, Trenton, N. J.; bids July 27.

140 tons, state bridgework, Wyoming County, Pennsylvania; bids July 26.

100 tons, Catholic school, Staten Island, N. Y.; bids closed.

REINFORCING BARS . . .

REINFORCING BARS PLACED

580 tons, Veterans' Hospital, Ft. Harrison, Mont., to Pacific Coast Div., Bethlehem Steel Co., Seattle; Henry George & Sons, Spokane, Wash., general contractor.

500 tons, supply concrete cylinder pipe, Mt. Vernon, Wash., to American Pipe & Construction Co., Portland, Oreg.

480 tons, bridge, Passagassawaukeag River, Belfast, Maine, to Bancroft & Martin Rolling Mills Co., South Portland, Maine; Ellis C. Snodgrass, Inc., Portland, general contractor.

152 tons, four span, composite wide flange beam bridge, South Burlington, Vt., to Bethlehem Steel Co., Bethlehem, Pa.; E. T. O'Neill & Son Construction Corp., Westfield, Mass., general contractor; also 8540 linear feet of steel piles to Bethlehem Steel Co., Bethlehem, Pa.

200 tons, Metropolitan Sewage District, Seattle, to five local suppliers; General Construction Co., Seattle, general contractor.

105 tons, including 40 tons, steel piles, two bridges, Bridgewater, Vt., to Bethlehem Steel Co., Bethlehem, Pa.; W. W. Wyman Co., subcontractor for bridges.

REINFORCING BARS PENDING

560 tons, state bridgework, Route 80, Sec. 5P, Bergen County, New Jersey; bids Aug. 9; also, 1617 tons of structural steel required.

435 tons, state bridgework, Route 3, Sec. 1B, Bergen County, New Jersey; bids July 25.

235 tons, 458 ft girder bridge, Curry County, Oregon; Tom Lillebo, Reedsport, Oreg., low at $304,323 to Bureau of Public Roads, Portland, Oreg.

196 tons, state bridgework, Route 287, Sec. 13B and 14A, Morris County, New Jersey; bids Aug. 10.

185 tons, Idaho, state spans and passes, Canyon County; bids to Boise, Idaho, July 18.

PLATES . . .

PLATES PLACED

500 tons, 39,000 ft concrete cylinder supply pipe, Mt. Vernon, Wash., to American Pipe & Construction Co., Portland, Oreg.; Harold Kaeser, Seattle, general contractor.

325 tons, also reinforcing bars, 60 in. concrete cylinder supply pipe, industrial development, Seattle, to United Concrete Pipe Corp., Auburn, Wash.

300 tons, four storage tanks for Union Oil Co. of California, Coos Bay, Wash., to Chicago Bridge & Iron Co., Seattle.

200 tons, welded pipe for Atomic Energy Commission, Richland, Wash., to Consolidated Western Steel Corp., Seattle.

125 tons, also reinforcing bars, 66 in. concrete cylinder pipe for Seattle's Tolt River water project, to United Concrete Pipe Corp., Auburn, Wash.

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WARD

For Countless Uses of

SPRING STEEL

AMERICA'S LEADING SUPPLIER Where SERVICE and QUALITY is the rule

WARD STEEL CO.

Boston—Cambridge, Mass.
Chicago, Ill.—Greensboro, N. C.

You spent $450,000,000 on bowling last year

13½ times as much as you gave to fight cancer

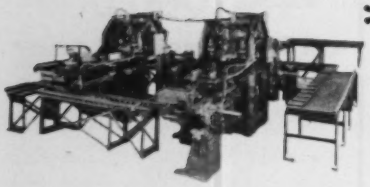
Shocking? Yes. And here's another shocking fact: in 1961, cancer will strike in approximately two out of three homes.

Go bowling. It's fun. Enjoy yourself. But when you spend fifty cents to knock down pins—give as much to the American Cancer Society—*to knock out cancer.*

If you do that, you will be giving $450,000,000 to fight cancer this year. *Thirteen and a half times as much as last year!* Fight cancer with a checkup—and a check to the **American Cancer Society.**

36,763* molds per hour?...

10238-SI



WORLD'S LARGEST SUPPLIERS OF MOLDING MACHINES

SPO INCORPORATED
6494 Grand Division Ave.,
Cleveland 25, Ohio

* **THE FIGURE IS RIGHT...**

AND ACTUALLY QUITE CONSERVATIVE!

The identification trade mark of SPO states that this organization is the "World's largest supplier of mold-machines." This is not just another advertising claim. There are SPO machines operating all over our globe . . . in almost every country. At this moment, men of every race, creed and color . . . and speaking virtually every language and dialect in the world . . . are producing molds on machines bearing the name SPO. It is our conservative estimate that MORE than 36,763 molds will be produced in THIS hour.

Our leadership has been earned . . . earned through long years of devotion to the industry and applied skill within individual professions comprising the entire field of metals. In foundry molding systems, our technological advances resulting from creative engineering, have established new horizons of molding progress.

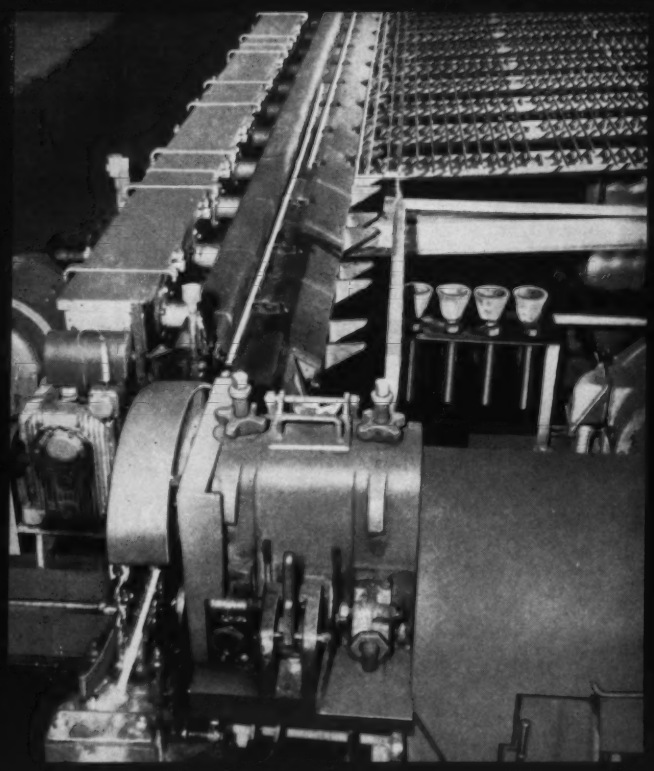
SPO leadership will not go unchallenged . . . however . . . we propose to continue our dedication to progress. We will continue to improve our creative engineering services so that we can continue to supply versatile, efficient, economical "packaged" systems to meet every molding requirement, including Turnkey facilities.

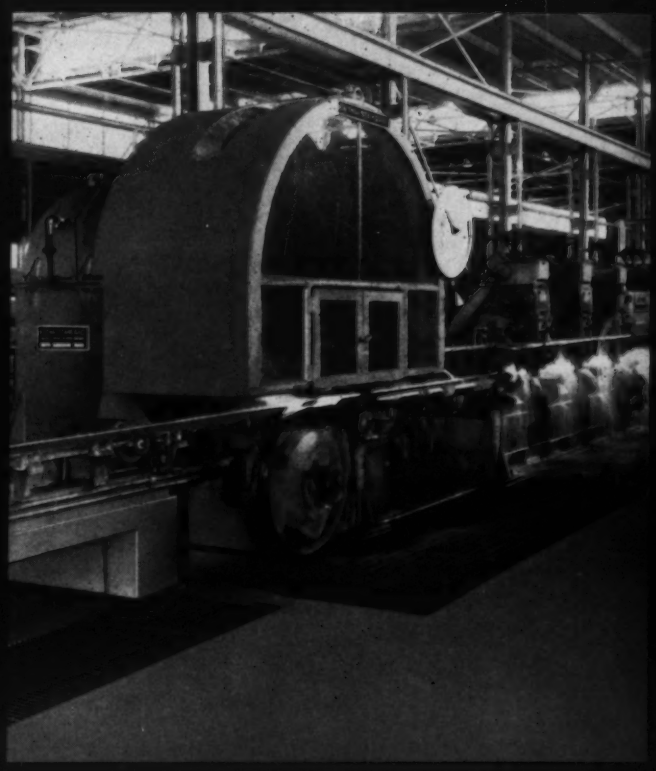
THERE'S A SPO MACHINE FOR EVERY MOLDING JOB

2 REASONS...FOR

HIGH-SPEED PRODUCTION OF PIPE... (Small diameter)

by C. W. Mills, E. W. Mills, Seamless or Stretch Reducing





ROTARY KICKOUT

- Transfers pipe to Cooling Beds at high speeds.
- Simple mechanical design.
- No great gap required between pipe lengths.
- Pipes are staggered in Kickout and come to a complete rest in Kickout before being transferred onto the Cooling Bed.

ROTARY FLYING HOT SAW

- Cuts any desired length at close length tolerances.
- Length of cut can be changed at full mill speed.
- Runs continuously at high speeds.
- 24 Rotary Flying Saws in successful operation. Latest saw has been tested by actual running at speeds of 2000 F.P.M. and higher.

Aetna-Standard Division • 300 Sixth Avenue • Pittsburgh 22, Pennsylvania

OTHER FEATURES OF AETNA-STANDARD PIPE MILLS:

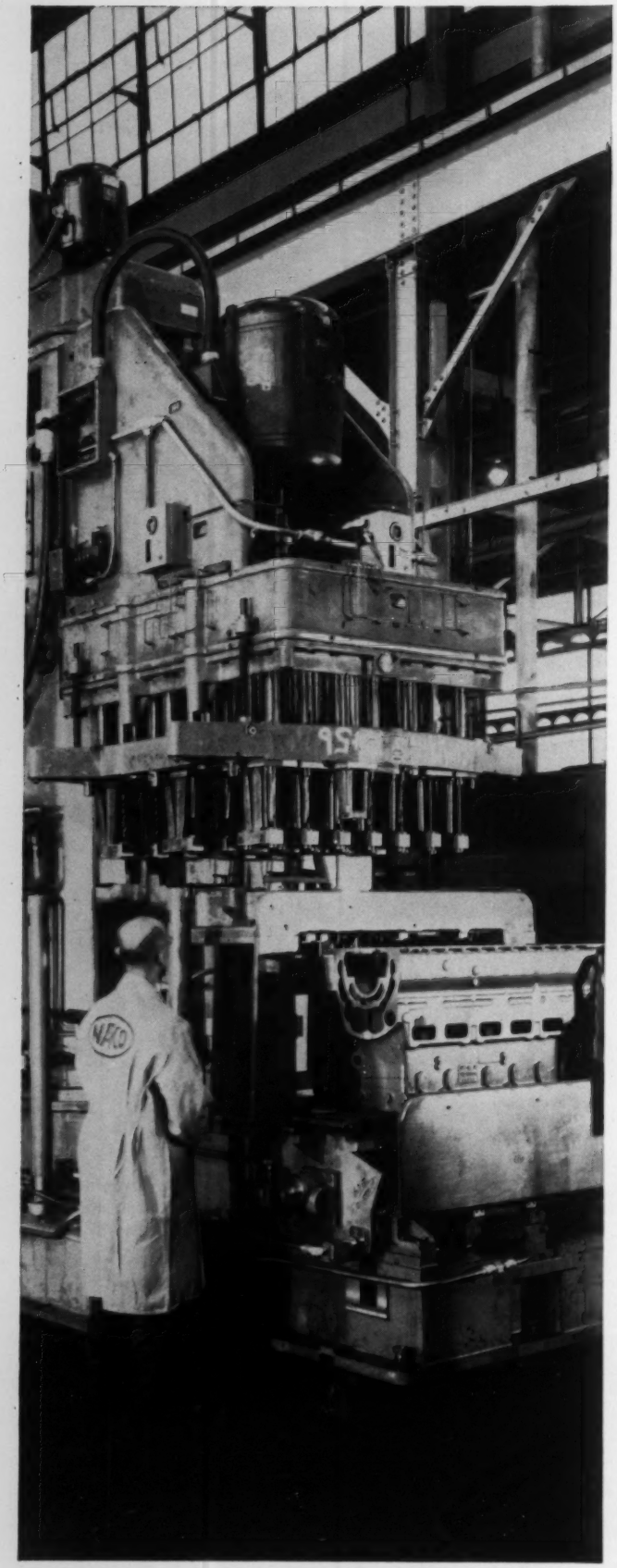
Stretch Reducing—Simple and rugged design allows fast changing of mill.

Cooling Beds—Screw type with Cooling Tanks. Automatic pipe handling for dividing of pipe and cropping if desired.

Uncoilers—Automatic handling of coils. No manual labor required.

Aetna-Standard Division

BLAW-KNOX

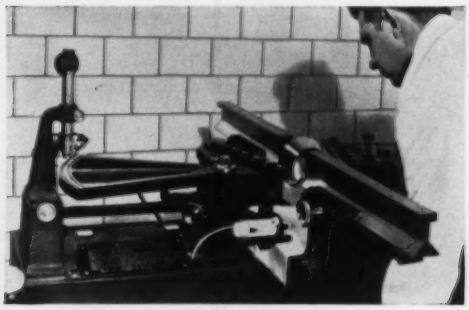


How NATCO'S 87 spindles stay accurate

When National Automatic Tool Company designed this Model C5A-129 machine that drills, reams and counterbores, they had some tough problems. One was long-lasting accuracy for the 87 spindles requiring 174 bearings. The bearings used would have to assure accuracy under heavy loads at high speeds. And space limitations demanded that the bearings have maximum radial and thrust capacity in minimum space.

With the help of Timken Company engineers NATCO designers were able to select from the many types and sizes of Timken® tapered roller bearings, the one exactly suited for the job. The flanged cups of the 174 Timken bearings selected for the 87 spindles allowed shorter housings, through-boring for accurate alignment and saved space.

Spindle rigidity and accuracy are assured because the taper of Timken bearings lets them take *any* combination of radial and thrust loads. Full-line contact between their rollers and races provides extra load-carrying capacity.



TOP BEARING ACCURACY is assured because of our gage lab, the industry's finest. Some instruments we use measure even the thickness of several molecules, or split a hair 30,000 times.

The Timken Roller Bearing Company, Canton 6, Ohio. Cable: "TIMROSCO". Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits. Canadian Division: Canadian Timken, St. Thomas, Ontario.

Industry rolls on

TIMKEN®

tapered roller bearings